TABLE OF CONTENTS

Chapter 1 - Introduction

1.1 General Information 1-1
1.2 Equipment Requirements 1-2
  1.2.1 Software Licenses 1-3
    1.2.1.1 Oracle Run-Time License 1-4
    1.2.1.2 Oracle Full-Use License 1-5
    1.2.1.3 Operating System and File System 1-5
1.3 How to Use This Book 1-6
  1.3.1 Manual Organization 1-6
  1.3.2 Differences Between Master and MOD 300 1-7
1.4 Conventions 1-8
1.5 Related Documentation 1-9
1.6 Release History 1-15
1.7 Terminology 1-18
1.8 Product Overview 1-20
  1.8.1 AdvaInform Basic Software 1-21
  1.8.2 Optional AdvaInform Software 1-22
    1.8.2.1 AdvaInform History 1-23
    1.8.2.2 AdvaInform Reports 1-23
    1.8.2.3 AdvaInform Object Handling 1-23
    1.8.2.4 DataSet (Master only) 1-24
    1.8.2.5 AdvaInform Calculations (Master only) 1-24
    1.8.2.6 AdvaInform Event Log (Master only) 1-24
    1.8.2.7 AdvaInform SPC (MOD 300 only) 1-24
    1.8.2.8 AdvaInform PDL (MOD 300 only) 1-25
    1.8.2.9 AdvaInform CI (MOD 300 only) 1-25
    1.8.2.10 AdvaInform Display 1-25
    1.8.2.11 AdvaInform SQL*Connect 1-25
    1.8.2.12 AdvaInform SQL*Connect Programming 1-26
    1.8.2.13 AdvaInform User API 1-26
  1.8.3 Optional AdvaBuild Software 1-26
    1.8.3.1 AdvaBuild Object Type Builder 1-26
    1.8.3.2 AdvaBuild Central Backup (Master only) 1-26
  1.8.4 Optional AdvaTalk software 1-27
    1.8.4.1 AdvaTalk Link to MATLAB 1-27
  1.8.5 Other Optional software 1-27
    1.8.5.1 Station Software - Enware 1-27
    1.8.5.2 SQL*NET and ODBC for Windows 3.11, 95 and NT ... 1-27

CONTENTS (continued)

1.8.5.3 Programmer 2000 - Pro*C 1-27
1.8.5.4 Online JFS 1-28
1.8.5.5 MasterBatch compatibility 1-28
1.8.6 Development and Integration of User Applications........ 1-28
1.8.6.1 Overview 1-28
1.8.6.2 Examples 1-29
1.8.6.3 Make and Script Files for Your Convenience 1-29
1.8.6.4 AdvaInform File Structure - Applications........ 1-29
1.8.6.5 Rules for Your Data Files 1-30
1.8.6.6 AdvaInform Basic Software........ 1-30
1.8.6.7 User Objects 1-31
1.8.6.8 Calculations (Master only) 1-32
1.8.6.9 Comparison of Development Tools........ 1-32
1.8.7 Hardware Options 1-37

Chapter 2 - Installation

2.1 Site Planning and Environment........ 2-1
2.2 Start-up Procedures 2-1
2.2.1 How to Log Into the IMS Menu........ 2-2
2.2.2 IMS Menu Icon 2-3
2.3 Shutdown Procedures........ 2-3
2.3.1 How to Stop AdvaInform Processes 2-3
2.3.2 Power Down........ 2-4
2.4 Installation Procedures 2-5
2.4.1 Quick Reference for Upgrade and Installation Procedures........ 2-5
2.4.1.1 Upgrade 2-6
2.4.1.2 New Installation 2-6
2.4.2 Calculate Required Primary Memory 2-7
2.4.2.1 Memory Extensions For User Objects and History........ 2-8
2.4.3 Calculate Required Disk Space........ 2-12
2.4.4 Requirements for Installation........ 2-14
2.4.5 Prepare for Upgrade 2-15
2.4.6 How to connect the CD-ROM reader........ 2-20
2.4.7 How to Install HP-UX 10.20 and HP Options 2-21
2.4.8 AdvaInform Software Installation........ 2-24
2.4.8.1 Verifications Before AdvaInform Software Installation is Started 2-24
2.4.8.2 How AdvaInform Software is Packaged on CD-ROM .. 2-32
2.4.8.3 Installation Overview 2-33

CONTENTS (continued)

2.4.8.4 Installation with swinstall 2-33
2.4.9 Post Installation Procedures 2-35
2.4.9.1 Selecting Workstation Mode 2-35
2.4.9.2 Configuring the Control Network 2-36
2.4.9.3 Check Log File 2-37
2.4.9.4 Install Patches and Revisions 2-38
2.4.9.5 Updating the OMF config.cfg File 2-38
2.4.9.6 Configuring UPS 2-39
2.4.10 Post-Upgrade Work 2-40
2.4.10.1 Restore Application Data 2-40
2.4.10.2 Post-Upgrade Procedures for AdvaInform Reports 2-42
2.4.10.3 Post-Upgrade for AdvaInform History (MOD 300 only)2-43
2.4.10.4 Post-Upgrade for AdvaBuild Object Type Builder 2-43
2.4.10.5 Post-Upgrade Procedures for AdvaInform Event Log... 2-44
2.4.10.6 Post-upgrade for AdvaInform User API 2-44
2.4.10.7 Post-upgrade of clock-synchronization 2-44
2.4.10.8 Post-upgrade work for Process Supervision 2-44
2.4.10.9 Post-upgrade work with files tnsnames.ora and listener.ora 2-44
2.5 How to Install Software Options or Patches 2-45
2.5.1 Upgrade from Stand Alone to Networked AdvaInform Basic Functions 2-46
2.6 How to Remove Software Options 2-47
2.7 Configuring TCP/IP (Internet) Addresses 2-48
2.8 How to generate a new Type Directory 2-48
2.9 How to Correct the Time Zone set-up 2-49
2.10 How to Re-start AdvaInform Software Manually 2-49
2.11 Uninterruptible Power Supply UPS 2-50
2.12 X-station 2-50
2.13 Web server Netscape FastTrack 2-51
2.14 How to Extend a Logical Volume After Installation 2-52

Chapter 3 - Configuration

3.1 Overview 3-1
3.2 Database Configuration Requirements for MOD 300 3-1
3.2.1 GENERICD Object 3-3
3.2.2 Database Objects for History 3-5
3.2.2.1 AREA Object 3-6
3.2.2.2 MSG_ROUT Object 3-8

CONTENTS (continued)

3.2.3 Database Objects for Reports and PDL 3-9

3.3 How to Configure the IMS to Support Peripheral Devices........ 3-10

3.3.1 Printer Setup........ 3-10

3.3.1.1 Overview 3-10

3.3.1.2 The Printer and Plotters Presentation 3-13

3.3.1.3 The Print Requests Presentation........ 3-21

3.3.1.4 Save/Restore Spooler Configuration 3-22

3.3.1.5 Manipulating the Presentation........ 3-23

3.3.1.6 How to Exit the Printer Configuration Window........ 3-25

3.3.2 Connecting a Printer to Serial or Parallel Port 3-25

3.3.3 Connecting a TCP/IP Printer........ 3-25

3.3.4 Disk Drive and SCSI device Setup 3-25

3.3.5 How to connect the CD-ROM reader........ 3-26

3.3.6 DAT Set-up and Compression........ 3-26

3.3.7 CD-ROM Reader Set-up 3-26

3.4 Tuning the Oracle Database 3-27

3.5 Uninterruptible Power Supply - UPS 3-27

3.5.1 UPS Functionality and Advant Station Shutdown on Battery Low...... 3-27

3.5.2 UPS States and Corresponding Messages........ 3-27

3.6 Administration and Maintenance Functions 3-28

3.6.1 How to Configure Control Network Parameters........ 3-28

3.6.2 How to Define and Manage Users 3-30

3.6.2.1 Introduction 3-30

3.6.2.2 User Definition Window 3-32

3.6.2.3 How to Create a User 3-34

3.6.2.4 How to Set a Password........ 3-37

3.6.2.5 How to Modify an Existing User 3-38

3.6.2.6 How to Change a Password........ 3-39

3.6.2.7 How to Delete a User 3-40

3.6.3 Process Supervision 3-41

3.6.4 System Variables........ 3-49

3.6.5 System Messages 3-51

3.6.6 Real Time Accelerator Configuration (Master only) 3-51

3.6.7 Node Broker (Master only) 3-51

3.6.8 RTA Language (Master only)........ 3-54

3.6.9 MasterBus 300E (Master only) 3-54

3.6.10 MasterBus 200 (Master only)........ 3-54

3.6.11 Time Synchronization and Time Setting........ 3-55

CONTENTS (continued)

3.6.11.1 Time Synchronization for Systems with Master Software - Normal ... 3-55
3.6.11.2 Using an external source for Time Synchronization - Master ... 3-58
3.6.11.3 Using an External Source for High Precision Synchronization - Master ... 3-58
3.6.11.4 Time Synchronization for Systems with MOD 300 Software ... 3-59
3.6.11.5 Daylight Saving ... 3-59
3.6.11.6 Time Zone ... 3-60
3.6.11.7 How to Set the Date and Time manually ... 3-61
3.6.12 How to set-up Mail ... 3-62
3.6.13 Memory Pool Utility (MOD 300 Only) ... 3-63
3.6.14 Web server Netscape FastTrack ... 3-65

Chapter 4 - Capacity and Performance

4.1 General ... 4-1
4.2 AdvaInform History ... 4-1
4.2.1 General ... 4-1
4.2.2 Default disk and database space ... 4-1
4.2.3 Numerical Logging using TTD (Master) ... 4-3
4.2.4 User Supplied Data Through Datasets (Master) ... 4-4
4.3 AdvaInform Reports ... 4-4
4.4 AdvaInform User API ... 4-5
4.5 AdvaInform SQL*Connect ... 4-8
4.5.1 AdvaInform SQL*Connect - Client ... 4-8
4.5.2 SQL*Connect - Server ... 4-9
4.5.3 AdvaInform SQL*Connect Programming ... 4-10
4.5.4 AdvaBuild Object Type Builder ... 4-11
4.5.5 AdvaInform Object Handling ... 4-11
4.6 Dataset (Master) ... 4-14
4.6.1 Reading Data From Advant Controllers ... 4-14
4.6.2 Datasets are Sent From Object Handling to Advant Controllers ... 4-17
4.6.3 Max Test ... 4-17
4.6.4 Comparison Dataset with User API ... 4-17
4.7 AdvaInform Calculations (Master) ... 4-18
4.8 AdvaInform Event Log (Master) ... 4-20
4.9 AdvaTalk Link to MATLAB ... 4-22
4.10 Typical Configurations ... 4-23

CONTENTS (continued)

4.10.1 Typical Configuration 1 - Master 4-23
  4.10.1.1 General 4-23
  4.10.1.2 Active Logs, Objects, Calculations and Reports 4-23
  4.10.1.3 Active Data Clients (operator stations) 4-24
  4.10.1.4 CPU Load 4-25
4.10.2 Typical Configuration 2 - Master 4-26
  4.10.2.1 General 4-26
  4.10.2.2 Active Logs, Objects, Calculations and Reports 4-26
  4.10.2.3 Active Data Clients (operator stations) 4-27
  4.10.2.4 CPU Load 4-28

Chapter 5 - Maintenance

5.1 Trouble Shooting 5-1
5.2 System Message presentation 5-3
  5.2.1 System Message Display 5-3
  5.2.2 bsLogTool - non graphical presentation 5-4
  5.2.3 General Error Messages 5-4
5.3 Preventive Maintenance 5-5
5.4 Problem Reporting 5-5
5.5 Maintenance Tools and Recommendations 5-5
5.6 Hardware Indicators 5-6
5.7 Backup and Restore 5-6
  5.7.1 Introduction 5-6
    5.7.1.1 Full Backup and Full Restore 5-7
    5.7.1.2 Incremental Backup and Restore, Functional Restore 5-7
    5.7.1.3 The Station Backup window 5-8
  5.7.2 Basic Procedure for Backup and Restore 5-9
  5.7.3 Full Backup and Full Restore 5-11
    5.7.3.1 General 5-11
    5.7.3.2 Full Backup 5-11
    5.7.3.3 Full Restore from the Station Backup Window 5-12
    5.7.3.4 Full Restore from the HP-UX command line 5-13
    5.7.3.5 Full Restore using HP-UX Core-OS CD 5-14
    5.7.3.6 Full Restore to IMS1.3-0 5-15
  5.7.4 Incremental Backup and Restore, Functional Restore 5-15
    5.7.4.1 Incremental Backup 5-16
    5.7.4.2 Specifying Backup of your System Application 5-16
    5.7.4.3 Restore of Incremental Backup 5-17
    5.7.4.4 Functional Restore 5-17

CONTENTS (continued)

- 5.7.5 How to Change Program Data 5-19
- 5.7.6 How to Interpret Status Indicators 5-20
- 5.7.7 How to Schedule Backup/Restore Functions 5-20
  - 5.7.7.1 Year Configuration 5-21
  - 5.7.7.2 Month Configuration 5-21
  - 5.7.7.3 Day Configuration 5-22
  - 5.7.7.4 Hour Configuration 5-24
  - 5.7.7.5 Minute Configuration 5-25
- 5.8 Disk Space Recovery 5-26
- 5.9 Saving disk space 5-26
- 5.10 UPS system messages 5-26
- 5.11 Usage of dcSystem.log 5-27
- 5.12 How to use man -k 5-27

Appendix A - Log in to the Initial System Loader (ISL)

- A.1 General A-1
  - A.1.1 Procedure for AS 520/B132L, AS 520i /B132L, AS 530/C110 and AS 530/B180L A-1
  - A.1.2 Procedure for AS515/50 and AS520/50 .... A-2
  - A.1.3 Procedure for AS515/64 and AS515/100 .... A-4
  - A.1.4 Procedure for AS520i/64 and 520i/100 .... A-5
  - A.1.5 Installation procedure for AS530/99 .... A-7

Appendix B - IMS File System

- B.1 Top Level B-1
- B.2 Components Level B-3
- B.3 Function Level B-4
- B.4 Data Level B-5

ILLUSTRATIONS

Figure 1-1. An Advant Station 5XX Configured as an Information Management Station 1-1
Figure 1-2. Manual Organization Window 1-6
Figure 1-3. AdvaInform Software Structure 1-21
Figure 2-1. The first HP CDE Login Screen 2-1
Figure 2-2. IMS menu 2-2
Figure 2-3. IMS menu Icon 2-3
Figure 2-4. Wizard - performing RTA backup 2-18
Figure 2-5. Wizard - Defining the tape device 2-19
Figure 2-6. Taking care of customer specific tablespaces 2-20
Figure 2-7. swapinfo to Check Swap Space Size 2-24
Figure 2-8. swapinfo to Determine Swap Space Distribution 2-25
Figure 2-9. lvdisplay output for logical volume 2 2-26
Figure 2-10. lvdisplay output for logical volume 4 2-27
Figure 2-11. Output of pvdisplay command 2-28
Figure 2-12. pvmove Command 2-29
Figure 2-13. Verifying that swap space has been moved 2-30
Figure 2-14. Workstation Mode dialog box 2-35
Figure 2-15. Control network configuration dialog box for MASTER 2-36
Figure 2-16. Control network configuration dialog box for MOD 300 2-37
Figure 2-17. Editing UPS_TYPE Environment Variable 2-39
Figure 2-18. Import preparations 2-40
Figure 2-19. preparing import of History data 2-41
Figure 2-20. End of Upgrade Screen 2-42
Figure 2-21. swremove Graphical Interface 2-47
Figure 3-1. MOD 300 Database Hierarchy Related to GENERICD Object 3-2
Figure 3-2. GENERICD Object, Template Builder window 3-3
Figure 3-3. AREA Object, Template Builder View, Page 4 w/MESSAGE CTR window 3-6
Figure 3-4. MSG_ROUT Object, TEB window 3-8
Figure 3-5. UNIT_MAST Object 3-9
Figure 3-6. SAM Window 3-11
Figure 3-7. SAM Area Printers and Plotters 3-11
Figure 3-8. SAM Areas: Printers and Plotters => LP Spooler 3-12
Figure 3-9. Printer Configuration Main Window (Printers and Plotters) 3-12
Figure 3-10. Printer Configuration Main Window (Printers and Plotters). 3-13
Figure 3-11. Parallel Printer Hardware Location Dialog Box 3-15
Figure 3-12. Add Local Printer - Dialog Box 3-15

ILLUSTRATIONS (continued)

Figure 3-13. Serial Printer Hardware Location Dialog Box 3-16
Figure 3-14. Add Remote Printer Dialog Box 3-17
Figure 3-15. Remove Printer Confirmation 3-19
Figure 3-16. Shut Down Printer Spooler Confirmation 3-20
Figure 3-17. Printer Configuration Main Window (Print Requests).............................. 3-21
Figure 3-18. Printer Configuration Main Window (Save/Restore Spooler Configuration) 3-22
Figure 3-19. Column Editor Dialog Box (Printers and Plotters).................................... 3-23
Figure 3-20. Filter Dialog Box (Printers and Plotters)... 3-24
Figure 3-21. Sort Dialog Box (Printers and Plotters)... 3-24
Figure 3-22. File Menu for Printer Configuration.. 3-25
Figure 3-23. Control network Configuration Dialog (Master Version) 3-28
Figure 3-24. Network Node Description on IMS Menu 3-30
Figure 3-25. User Definition window 3-32
Figure 3-26. Create User dialog box 3-34
Figure 3-27. Set Password Dialog Box 3-37
Figure 3-28. Modify User dialog box... 3-38
Figure 3-29. Delete User Dialog Box... 3-40
Figure 3-30. Example Process Supervision Record 3-43
Figure 3-31. Process Supervision Configured to Start Once at IMS Start Up................ 3-47
Figure 3-32. Process Supervision using Pre-defined Argument List 3-48
Figure 3-33. The System Variables dialog box 3-49
Figure 3-34. SYSTEM_EDITOR Variable selected 3-50
Figure 3-35. The System Message window 3-51
Figure 3-36. Node Broker Display... 3-52
Figure 3-37. The Date & Time dialog box... 3-61
Figure 3-38. mputil Menu 3-63
Figure 3-39. mputil Main Display.. 3-64
Figure 4-1. History CPU load in typical configuration 2.. 4-3
Figure 4-2. User supplied data through Datasets 4-4
Figure 4-3. User API - read capacity related to size of request 4-5
Figure 4-4. Read capacity related to number of attributes per object in request............ 4-6
Figure 4-5. User API - Comparing CPU load for different access methods.................. 4-7
Figure 4-6. Performance execute operations - Master 4-8
Figure 4-7. SQL*Connect Client Performance... 4-9
Figure 4-8. SQL*Server - CPU load 4-10
Figure 4-9. CPU load when reading data with Do Request 4-11
Figure 4-10. Object Handling - coBasicCalc CPU load in a Master system 4-12

ILLUSTRATIONS (continued)

Figure 4-11. Performance when executing objects reading 50 inputs per object............4-13
Figure 4-12. Object Handling - Performance executing Operations - Master.................4-14
Figure 4-13. Datasets delivered to DAT objects...4-15
Figure 4-14. Datasets delivered directly to User API programs.....................................4-16
Figure 4-15. Datasets are sent from Object Handling to controllers..............................4-17
Figure 4-16. User API - Comparing CPU load for User API and dataset respectively...4-18
Figure 4-17. Performance curves - calculation instances...4-19
Figure 4-18. Calculations - CPU load related to number of inputs.................................4-20
Figure 4-19. Event Log Average CPU Load 4-21
Figure 4-20. Link to MATLAB performance..4-22
Figure 5-1. Principles of Incremental Backup...5-7
Figure 5-2. Station Backup window..5-8
Figure 5-3. Station Backup window..5-10
Figure 5-4. IMS Station Backup Prompt in terminal window..5-12
Figure 5-5. Advant Station Backup Prompt in terminal window.....................................5-12
Figure 5-6. Advant Station Restore Prompt in terminal window....................................5-13
Figure 5-7. Advant Station Restore Prompt in terminal window....................................5-13
Figure 5-8. Incremental Backup and Functional Restore...5-16
Figure 5-9. Restore Form window...5-18
Figure 5-10. The Change Program Data dialog box...5-19
Figure 5-11. The Execution Configuration dialog box...5-20
Figure 5-12. Month Configuration dialog box 5-21
Figure 5-13. Day Configuration dialog box 5-23
Figure 5-14. Hour Configuration dialog box..5-24
Figure 5-15. Minute Configuration dialog box 5-25
Figure A-1. Initial Screen for AS520 /B132L. The text on first line differ on AS530/B180L. A-1
Figure A-2. Dialog to select Boot Path for AS520 /B132L A-2
Figure A-3. Initial Screen for AS515/50 and AS520/50 ....A-3
Figure A-4. Dialog to select Boot Path for AS515/50 and AS520/50..............................A-3
Figure A-5. Initial Screen for AS515/64 and AS515/100 ....A-4
Figure A-6. Dialog to select Boot Path for AS515/64 and AS515/100.............................A-4
Figure A-7. Initial Screen for AS520i/64 and AS520i/100..A-5
Figure A-8. Dialog to select Boot Path for AS520i/64 ....A-6
Figure A-9. Dialog to select Boot Path for AS520i/64 ....A-6
Figure A-10. Initial Screen for AS530 ....A-7
Figure A-11. Dialog to select Boot Path for AS530...A-8
Figure B-1. File System - Top Level...B-1

ILLUSTRATIONS (continued)

Figure B-2. File System - Components Level B-3
Figure B-3. File System - Each component...B-4
Figure B-4. File System - Data Level B-5

TABLES

Table 1-1. Related Documentation................................ 1-9
Table 1-2. Guide to Documentation for Advant Station 500 series IMS.................... 1-11
Table 1-3. Summary of Development and Integration Tools.................................. 1-28
Table 1-4. Comparison of methods for application development................................ 1-35
Table 2-1. Primary memory requirements 2-7
Table 2-2. Example - Core memory requirements for functions based on User Objects................................ 2-9
Table 2-3. Required memory for AdvaInform History................................ 2-11
Table 2-4. Pre-configured/Recommended swap space 2-12
Table 2-5. Default Disk Usage - LVM and Swap 2-12
Table 2-6. Disk space requirements................................ 2-12
Table 2-7. AdvaInform Partitions 2-32
Table 3-1. Object Types for IMS Node................................ 3-2
Table 3-2. DCN Addresses for Nodes with Configurator Software 3-4
Table 3-3. UPS States................................ 3-27
Table 3-4. User Categories................................ 3-30
Table 3-5. User Privileges................................ 3-31
Table 3-6. IMS roles................................ 3-31
Table 3-7. Clock Synch Database Element................................ 3-56
Table 4-1. Maximum capacity and CPU load formulas AdvaInform History.............. 4-2
Table 4-2. Event Log presentation performance in seconds................................ 4-21
Table 4-3. CPU load Typical configuration 1 4-25
Table 4-4. CPU load Typical configuration 2 4-28
Table 5-1. Function name in the Restore Form................................ 5-17

Chapter 1 Introduction

1.1 General Information

This book describes the Advant® Station 500 Series Information Management Station (IMS). The IMS is the platform for AdvaInform® software. This book includes:

- an overview of all hardware and software options that can be installed on IMS
- instructions for system administrator tasks such as:
  - dimensioning disk and memory of the IMS.
  - powering up and shutting down the IMS.
  - connecting peripheral devices to the IMS.
  - installation of the AdvaInform software.
  - setting up time synchronization and daylight saving.
  - backing up and restoring files on the IMS.
- performance and capacity information for all AdvaInform, AdvaBuild® and AdvaTalk® software.

In addition this book provides a listing of other documentation related to the IMS. This includes documentation for IMS hardware, as well as documentation for AvaInform, AdvaTalk, and AdvaBuild software options that can run on the IMS. A guide to the IMS documentation tells you where to find more detailed information on a given subject.

This book is intended for system administrators that install and maintain system software and peripherals, and for anyone who wants a brief introduction to the provided functionality.

The hardware platform for the IMS is the Advant Station 500 Series, Figure 1-1.

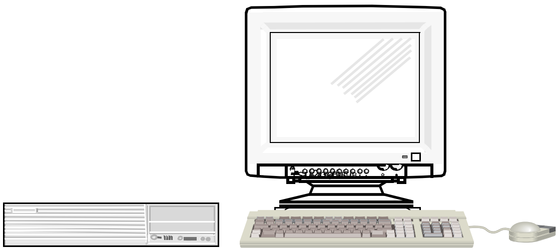


Figure 1-1. An Advant Station 5XX Configured as an Information Management Station

AdvaInform software is installed in an Advant Station. The AdvaInform software is optimized for information gathering and manipulation. It gathers, stores, manipulates and presents process and production information to support informed decision making by production management. It is also a software platform for integrating both your applications and vendor-supplied applications into the Advant OCS (Open Control System).

AdvaInform functions also offer open system features that make it possible to integrate information from all parts of the plant. You can access data consistently, whether the data resides in Advant OCS nodes (internal nodes) or external nodes.

The AdvaInform software provides:

- Basic Information Management functions such as object handling, reports, and history
- An Open System, based on international standards

  AdvaInform software provides a platform (an open system) and thus an open environment for ABB Business Units- (BUs), Business Areas- (BA´s), customer- and third party software so that integration towards the Advant OCS (hardware independence) is possible.
- Distribution

  Data can be physically stored in several computers and databases; however, to the end-user it appears as if all data is stored in one database.

  Applications and tools can be executed in several computers; however, to the end user it appears as if all applications are executed in one computer.
- Integration

  Process supervision, optimization, production management, simulation, training, and so on can be integrated into one automation system.
- Uniformity

  The user interface is built on standards such as X-windows and OSF/Motif.
- Portable Applications

  AdvaInform software provides interfaces allowing BU, BA and customers to build portable applications. Applications are built on interfaces such as AdvaInform User API, AdvaBuild Object Type Builder, SQL, OSF/Motif.
- Easy Engineering.

  AdvaInform provides graphical configuration tools, consistent error handling, NLS (native Language Support) and On-Line Help.

NOTE

The terms AdvaInform software and AdvaInform processes are used throughout this book to refer to all Advant OCS information management software. This includes AdvaInform, AdvaTalk, and AdvaBuild software, as well as other miscellaneous software.

1.2 Equipment Requirements

The basic AdvaInform software package is called the AdvaInform Basic Software. It consists of the AdvaInform Basic Functions, AdvaInform SQL*Connect and AdvaInform User API. Together with the Advant Station hardware, the AdvaInform Basic Software is the base for all AdvaInform functionality.

A detailed description of the Advant Station hardware (including peripherals) is provided in the *Advant Station 5xx Hardware User's Guide*.

A CD-ROM drive is required for software loading and a DAT tape drive is required for backup/restore.

The Advant Station is always equipped with at least one hard disk drive. Additional hard disk drives may be required to install AdvaInform and AdvaBuild options. There are several disks available to suit your needs.

The Advant Stations are delivered with a basic set of primary memory, and have capacity for extra memory pairs. To determine the capacity for extra memory pairs, refer to *Advant Station 5xx Hardware Users Guide.*

To use added applications and software options effectively, it is recommended that the memory capacity of the Advant Station be increased. Additional memory is required to support various options. Chapter 2, Installation includes tables to help you dimension your installed Advant Station properly.

If you require the IMS to communicate with other Advant OCS nodes, the optional Real Time accelerator (RTA) board must be included.

If X-terminals or other X clients are to be used, additional primary memory is needed.

1.2.1 Software Licenses

All Oracle licenses in the IMS are runtime licenses for a number of concurrent users.

The following software licenses are included with the AdvaInform Basic Functions software:

- A run-time license for the relational database (Oracle RDBMS), 2 concurrent users.
- SQL*Net
- TCP/IP driver for SQL*Net
- Oracle Forms (run-time version, you are not allowed to create new forms).
- SQL*Plus (run-time version).
- C-compiler license
- Netscape FastTrack Web Server

The AdvaInform Basic Software consists of the AdvaInform Basic Functions, User API and SQL*Connect. Subsequently it also includes licenses for AdvaInform User API and SQL*Connect. In addition, the operating system license for HP-UX 10.20 is also included.

C and C++ developers licenses

The AdvaInform Basic Functions includes a license for C-development for one user, normally used when developing User API programs. If several users will be working with C development, licenses for more users is available as an option.

As an alternative, C++ can be used for the development of User API programs. A C++ single users development environment is available as an option. If several developers will use it, two or more licenses can be purchased.

1.2.1.1 Oracle Run-Time License

NOTE

The use of Oracle within AdvaInform Basic Software is under license agreements between the end user, ABB Industrial Systems Inc. and Oracle Corp.

The AdvaInform Basic Functions includes a license for two concurrent database users which is enough for many configurations. However, as soon as PC and X-terminal clients, using the database, are added to the configuration, the number of concurrent users must be extended. The extension can be done to 8, 16 and to 32 concurrent users.

AdvaInform Oracle licensing for you as an end user

These are the implications of the license agreement for you as an end user:

- You are licensed to
  - read data from all the tables in IMS that you are granted access to including all SQL*Connect views giving you access to the Advant OCS objects.
  - create new database views, synonyms and links.
  - according to instructions from ABB Industrial Systems:
    - insert data into the AdvaInform tables (for example, db_ai, db_di).
    - extend the database files.
    - change the oracle configuration files.
  - Insert PL/SQL scripts in the database.
  - Run your own application programs written with the Programmer 2000 - Pro*C license.
- You are not licensed to
  - create new tables, alter existing tables or add new oracle users[1]. If you want to create SQL tables and applications you must buy an Oracle full use license, see below.
  - create any new forms or menus.
  - create new table spaces.
  - install Oracle tools in the AdvaInform relational database.

Oracle Forms in AdvaInform Basic Functions is a Run-Time version. You cannot create any new forms or menus under the Oracle Run-Time license.

---

[1] When you add a new IMS user you also add a corresponding oracle user. See the description of User Definition in *AdvaInform Basic Functions User´s Guide.*

1.2.1.2 Oracle Full-Use License

A full-use license is required if:

- you want to create your own Oracle tables.
- Oracle tools other than those delivered together with the AdvaInform Basic Functions or AdvaInform options are to be used. For instance, if forms are to be defined at the end customer's site using Oracle Forms.

NOTES

- If you need an Oracle full-use license, the full use license for the Database and for the tools you need must be purchased from your Oracle representative. You then install your full-use licensed database and tools "outside" the AdvaInform relational database either in the Advant Station or in a separate computer. After doing this you can connect the two databases using database links. Do not try to mix the new installation with the AdvaInform Relational Database structure.
- Oracle applications can be installed on a different node and access the AdvaInform Relational Database using SQL*Net™. Database links may be used to connect the application-specific database with the AdvaInform Relational Database.
- When you run two databases on an IMS you should extend the primary memory. Primary memory usage is application dependent, so exact recommendations can not be given.

1.2.1.3 Operating System and File System

The operating system for is HP-UX. The licence for HP-UX includes:

- HP-UX which is HP's implementation of the UNIX operating system.
- HP CDE (Common Desktop Environment).

Logical Volume Management (LVM)

When the HP-UX system is pre-installed on the Advant Station, the LVM is activated by default. This means that your disks are sectioned into logical volumes. You do not need to know on what disk a certain file or directory is placed. A logical volume may be placed on several disks.

The LVM is very convenient and you must select LVM if you are required to install HP-UX yourself prior to installation of the AdvaInform software (Chapter 2, Installation).

File system - HFS or JFS

Another selection that you need to make is which file system to use: HFS, JFS or both. HFS (Hierarchical File System) is the "old" type of file system, existing on HP-UX 9.0. JFS (Journalled File System) is a more modern file system that, together with the option OnLineJFS, makes it possible to maintain your file system on-line. JFS is recommended by ABB.

1.3 How to Use This Book

1.3.1 Manual Organization

This book is organized into chapters and sections as shown in Figure 1-2.

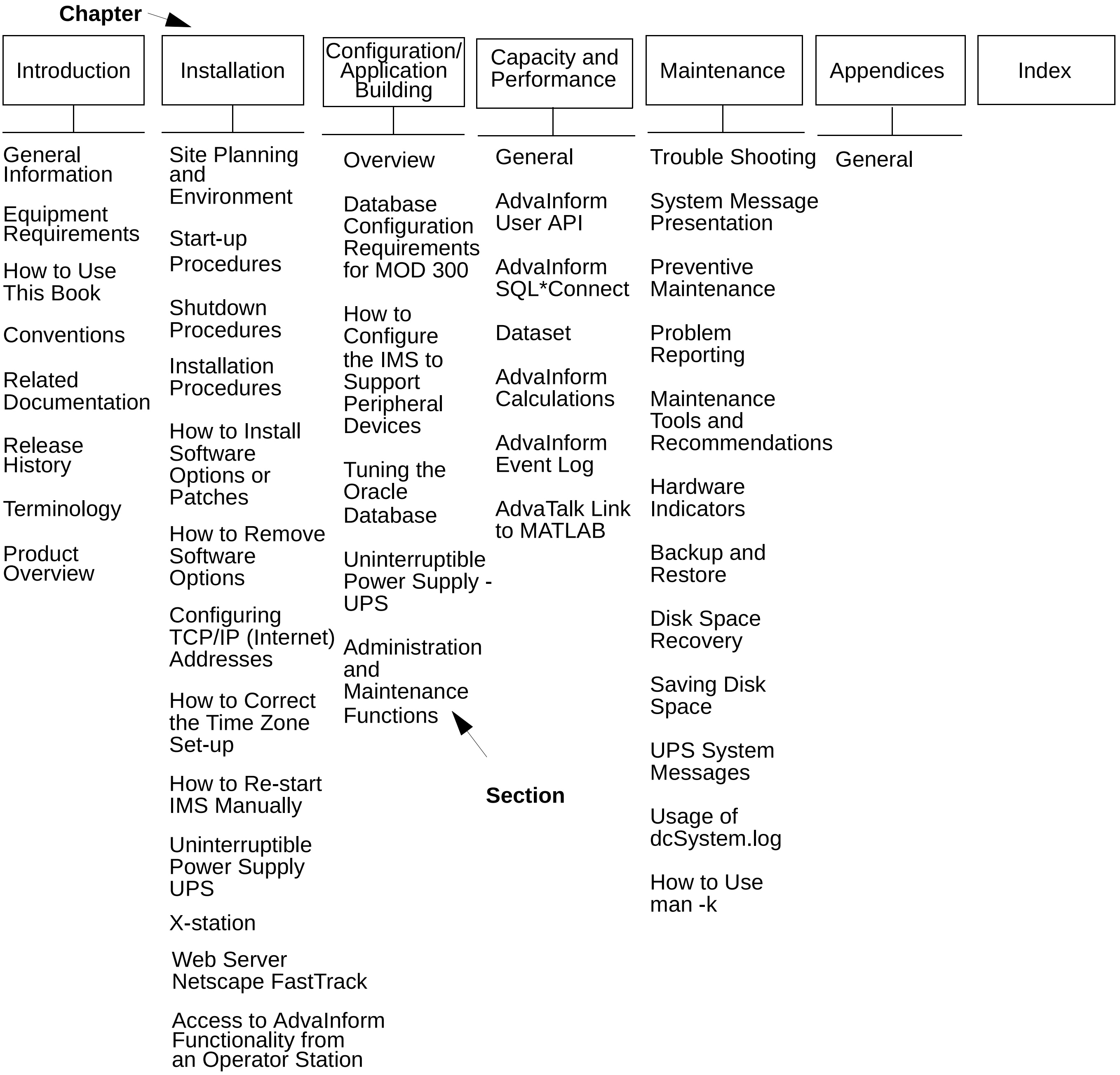

Chapter
Introduction
Installation
Configuration/ Application Building
Capacity and Performance
Maintenance
Appendices
Index
General Information
Equipment Requirements
How to Use This Book
Conventions
Related Documentation
Release History
Terminology
Product Overview
Site Planning and Environment
Start-up Procedures
Shutdown Procedures
Installation Procedures
How to Install Software Options or Patches
How to Remove Software Options
Configuring TCP/IP (Internet) Addresses
How to Correct the Time Zone Set-up
How to Re-start IMS Manually
Uninterruptible Power Supply UPS
X-station
Web Server Netscape FastTrack
Access to AdvaInform Functionality from an Operator Station
Overview
Database Configuration Requirements for MOD 300
How to Configure the IMS to Support Peripheral Devices
Tuning the Oracle Database
Uninterruptible Power Supply - UPS
Administration and Maintenance Functions
Section
General
AdvaInform User API
AdvaInform SQL*Connect
Dataset
AdvaInform Calculations
AdvaInform Event Log
AdvaTalk Link to MATLAB
Trouble Shooting
System Message Presentation
Preventive Maintenance
Problem Reporting
Maintenance Tools and Recommendations
Hardware Indicators
Backup and Restore
Disk Space Recovery
Saving Disk Space
UPS System Messages
Usage of dcSystem.log
How to Use man -k
General

Figure 1-2. Manual Organization Window

1.3.2 Differences Between Master and MOD 300

The following is a brief summary of the main differences in AdvaInform for Master and MOD 300.

Object Types

While some AdvaInform object types are common for both Master and MOD 300, there are also some object types that are unique to Master or MOD 300. A set of pre-defined Oracle views are available to facilitate data retrieval for these object types. Some views are common for Master and MOD 300, and some are unique. Refer to the applicable Object Types Reference Manual for details. There are separate manuals for MOD 300 object types and Master object types.

MEASURE and VALUE Object Attributes

One common object attribute for MOD 300 objects is the MEASURE attribute. The equivalent attribute for Master applications is VALUE. These attributes are used in some of the examples in this book. In some cases, two examples are provided showing both MEASURE and VALUE, and in other cases just one attribute or the other is shown. In all cases, the examples can be made applicable for both Master and MOD 300 by simply substituting the correct attribute.

Event and Alarm Handling

Event and alarm handling differs for MOD 300 and Master. In MOD 300 TCL billboard messages are supported. In Master “process” events and alarms are supported.

System Status

System status functionality differs between Master and MOD 300:

- Node Status - which provides all relevant status information about the IMS itself, is supported in both MOD 300 and Master systems.
- Network Status - which provides information about the connected MasterBus 300 network and the status of the other Advant Master nodes is only provided for Master systems.

TCL and CCF

TCL and CCF are software packages for MOD 300 applications. All examples and references for TCL and CCF are only applicable for MOD 300.

AdvaInform Options

Different AdvaInform options are available for MOD 300 and Master. For this reason, there may be different menu items available under the **AdvaInform**, **AdvaBuild and AdvaTalk** menu in the IMS menu bar for MOD 300 and Master.

1.4 Conventions

The following conventions are used throughout this manual for the presentation of material:

- The words in proper names of screen elements (for example, the title in the title bar of a window, the label for a field of a dialog box) are initially capitalized.
- The names of keyboard keys are boldfaced.
  - Initial capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, the **Return** key or **<Return>**.
  - Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the **space bar**, **comma key**, and so on.
  - In descriptions, the word "key" is used in conjunction with its name. For example, pressing the **Return** key initiates the process.
  - In tables and procedures, angle brackets replace the word "key." For example, press **<Return>**.
  - A dash is used to indicate that you must simultaneously press several keys. For example, **<Ctrl-C>** indicates that you must hold down the **Control** key while pressing the **C** key.
  - The phrase "press and release" is used to indicate that you sequentially press several keys.
- The names of push and toggle buttons are boldfaced.
  - Initial capital letters are used for the name of a push or toggle button labeled on the display. For example, the **OK** button.
  - In descriptions, tables and procedures, the word "button" is used in conjunction with its name. For example, pressing the **OK** button initiates the process.
- The names of menus and menu items are boldfaced.
  - Initial capital letters are used for the name of menus listed in the menu bar. For example, the **File** menu.
  - Initial capital letters are used for the name of menu items. For example, to open a new window, choose **New** from the **File** menu.
- System prompts/messages are shown in the Courier font, and user responses/input are in the boldfaced Courier font. For example, if you enter a value out of range, the following message is displayed:

  ```
  Entered value is not valid. The value must be 0-30.
  ```

  In a tutorial, you may be told to enter the string TIC132 in a field. The string is shown as follows in the procedure: **TIC132**

1.5 Related Documentation

A complete listing of documentation related to the IMS is shown in Table 1-1.

Table 1-1. Related Documentation

Category	Title	Description
Hardware	Advant Station 5XX(1) Hardware User's Guide	These books cover the installation and maintenance of the hardware for an Advant Station model.
Basic Software	AdvaInform Basic Functions User's Guide	This book describes the functionality, configuration of and use of the AdvaInform Basic Functions
	AdvaInform SQL Connect User's Guide	This book describes the Client and Server parts of AdvaInform SQL*Connect and how to use the available tools to configure those parts.
	AdvaInform User API User's Guide	This book describes the procedures and reference information for AdvaInform User API.
	AdvaInform Object Types Reference Manual	This Book provides table names and attribute names for all object types supported by AdvaInform.
Options	AdvaInform History User's Guide	This book describes how to configure and use the History option.
	AdvaInform Reports User's Guide	This book describes how to configure and execute reports.
	• Building Reports with Oracle Reports V2.5	The Oracle documentation provides information on Oracle Reports not covered in the AdvaInform Reports User's Guide. This documentation is available from ABB.
	• Oracle Reports Reference Manual V2.5	
	• Oracle Graphics Developers Guide V2.5	
	• Oracle Graphics 2 Reference Manual V2.5	
	AdvaInform Calculations User's Guide	Master only This book describes how to configure and use the AdvaInform Calculations option.

Table 1-1. Related Documentation (Continued)

Category	Title	Description
Options	AdvaInform Event Log User's Guide	Master only This book describes how to configure and use the AdvaInform Event Log option.
	AdvaInform SPC User's Guide	MOD 300 only This book describes how to configure and use the AdvaInform SPC option.
	AdvaInform PDL User's Guide	MOD 300 only This book describes how to configure and use the AdvaInform PDL option.
	AdvaInform SQL*Connect Programming User´s Guide	This book describes the optional SQL*Connect programming option.
	AdvaBuild Object Type Builder User's Guide	This book describes how to use the Object Type Builder option. Documentation for C++ compiler which can be ordered from the separate price list for document, is also recommended.
	AdvaBuild Central Backup	Master only This book describes how to configure and use the AdvaBuild Central Backup option.
	AdvaTalk Link to MATLAB User's Guide	This book describes how to configure and use the AdvaTalk Link to MATLAB option.
	AdvaInform Display	This book describes how to configure and use the AdvaInform Display option.
Other	AdvaInform Object Types Reference Manual (One for Master and one for MOD 300)	These books provides table names and attribute names for all object types supported by AdvaInform. This information is useful when you develop applications using such tools as AdvaInform User API.
	A Beginner's Guide to HP-UX	Included in the AdvaInform Basic software delivery. Describes HP-UX system commands. It also describes the vi editor and the elm mail package.
	HP System Administrator's Guide for HP 700RX & ENVIZEX	This is recommended for the system administrator who configures the system when X-terminals are used.
	HP ENWARE X station software Technical reference	Describes the HP Enware (X-terminal server support). Documentation optional in price list
	HP Common Desktop Environment	Included in the IMS delivery. describes how to use HP's Common Desktop to log on to an HP CDE session, copy files, create directories, use terminal windows, and so on.

Table 1-1. Related Documentation (Continued)

Category	Title	Description
Other	C/ANSI C Developer's Bundle kit	A C-licence is included in AdvaInform Basic Functions. However, the C manual has to be ordered separately. HP manuals for ANSI-C are needed by the development engineer who uses Object Access Services and uses the C-development license. Documentation includes C language reference manual, C programmers guide, C programming tools, HP-UX symbolic debugger and programming on HP-UX.
	HP C++ Programmer's Guide	Is recommended for the development engineer who develops applications with AdvaBuild Object Type Builder.
	MasterNet Users Guide	Master only Includes configuration rules for Advant OCS with Master software. It explains the concept of Control and Plant Network and the details regarding time synchronization and daylight saving.
	Read me before installation	An introduction to the installation procedure.
	Quick guide to Installation	A quick guide for the installation procedure.
	Installing HP-UX 10.10 and 10.20	A complete user's guide for installation of HP-UX 10.20.
	Configure HP-UX peripherals	Includes a description of how to configure different HP peripherals

(1) Advant Station 515, 520, 520i, or 530

Table 1-2 tells you what documentation to consult for detailed information on a given subject.

Table 1-2. Guide to Documentation for Advant Station 500 series IMS

Subject	Documentation	Comments
How to install and set up IMS hardware	The appropriate Advant Station 5xx Hardware User's Guide	This book provides site planning and cabling information.
How to connect peripheral devices to IMS and how to set-up printers	Advant Station 5xx Hardware User's Guide Advant Station 500 Series IMS User's Guide	The Advant Station Hardware User's Guide describes how to make the physical connections. The IMS User's Guide describes what you need to do in HP-UX so peripherals can operate in the HP-UX environment.

Table 1-2. Guide to Documentation for Advant Station 500 series IMS (Continued)

Subject	Documentation	Comments
How to install and use UPS	Advant Station 5xx Hardware User's Guide Advant Station 500 Series IMS User's Guide	The Advant Station Hardware User's Guide describes how to make the physical connections. The Advant Station 500 Series IMS User's Guide describes how to install the software to supervise the UPS and the functionality the software provides.
How to load software from CD-ROM	Advant Station 500 Series IMS User's Guide	This book describes how to - connect the CD-ROM reader - install Basic Functions and options and similar topics.
How to start up and shut down IMS	Advant Station 500 Series IMS User's Guide	See comments for How to Load software from CD-ROM.
Administration functions such as backup/restore and configuring editor and mail system defaults	Advant Station 500 Series IMS User's Guide	This book describes all IMS administration functions, including some that are accessible via AdvaInform Basic Functions.
How to set-up time synchronization and daylight saving	Advant Station 500 Series IMS User's Guide	This book describes all administration functions, including some that are accessible via AdvaInform Basic Functions.
How to configure and use SQL*Connect	AdvaInform SQL*Connect User's Guide	The book describes the Client and Server parts of AdvaInform SQL*Connect and how to use the available tools to configure those parts.
How to write database client applications using the SQL*Connect Programming and the Programmer 2000-Pro*C options.	AdvaInform SQL*Connect Programming User's Guide	The SQL*Connect Programming option together with or independent from the Programmer 2000-Pro*C option gives you the ability to write powerful database client applications in the AdvaInform environment.
How to configure SQL*Net and create database links for communication with nodes on the Plant Network	AdvaInform SQL*Connect User's Guide and Advant Station 500 IMS User´s Guide.	The AdvaInform database lets you communicate with databases in remote nodes and with database tools. These books describe the procedures.
How to use AdvaInform User API to develop and integrate user applications	AdvaInform User API User's Guide	The AdvaInform User API provides a programming library that lets you write your own applications. This book describes the procedures and reference information for AdvaInform User API.

Table 1-2. Guide to Documentation for Advant Station 500 series IMS (Continued)

Subject	Documentation	Comments
How to build user objects to develop and integrate user applications	AdvaBuild Object Type Builder User's Guide AdvaInform Object Handling User's Guide	The Object Type Builder User's Guide describes how to create user object types. The Object Handling User's Guide describes how to instantiate and execute the user objects.
How to do historical data collection	AdvaInform History User's Guide	AdvaInform History provides the means to configure and archive historical logs. This book provides instructions for these procedures.
How to configure, schedule, and execute reports	AdvaInform Reports User's Guide Oracle Developer/2000 Reports 2.5 Building Reports Manual Oracle Developer/2000 Reports 2.5 Reference Manual Oracle Developer/2000 Graphics 2.5 Developers Guide Oracle Developer/2000 Graphics 2.5 Reference Manual Also refer to the AdvaInform SQL*Connect User's Guide to learn how to configure the location table required to support SQL queries by AdvaInform Reports.	The AdvaInform Reports User's Guide describes how to use AdvaInform Reports software to configure, schedule, and execute reports. AdvaInform Reports provides the means to execute process reports which contain both current and historical information. Reports can be displayed on the screen, sent to printers, or stored as a file. They can also be stored in AdvaInform History. The Oracle documentation provides detailed instructions and reference information regarding Oracle 2.5 Reports and Oracle 2.5 Graphics. These books can be ordered from ABB.
How to create and verify calculations	AdvaInform Calculations User's Guide (Master)	This book describes the AdvaInform Calculations software package. It covers all steps from editing the calculation algorithm to executing the calculation.
How to Backup the application content of the Advant Controllers	AdvaBuild Central Backup User's Guide (Master)	The book describes the AdvaBuild Central Backup option and its user interface.It assists you to perform backup and restore activities.
How to historize events and how to present and evaluate them.	AdvaInform Event Log User's Guide (Master)	This book provides information about the AdvaInform Event Log option. The main purpose of the Event Log is to handle long time storage of large amounts of event data. The book also describes how to evaluate and present the events and how to use the statistical function.

Table 1-2. Guide to Documentation for Advant Station 500 series IMS (Continued)

Subject	**Documentation**	**Comments**
How to optimize the process using MATLAB	AdvaTalk Link to MATLAB Users Guide	This guide provides information about the AdvaTalk Link to MATLAB option. It provides the means to use the MATLAB software on your process data and help you optimize the control of that process. It can also function as an advanced calculation package against process values.
SPC **-** Statistical process Control	AdvaInform SPC User's Guide AdvaInform History User's Guide (MOD 300)	This book describes the AdvaInform Statistical Process Control (SPC) software which provides the means to monitor process variations and determine if the variations are random or systematic. SPC analysis then determines if the variations are within statistical control or outside your user-specified parameters. SPC is an option to AdvaInform History. Some support functions for SPC such as archival of SPC logs are accessible from History menus and are described in the AdvaInform History User's Guide.
PDL - Production Data Log	AdvaInform History User's Guide AdvaInform PDL User's Guide (MOD 300)	Production Data Logs (PDLs) support collection, storage, and retrieval of production data in primarily batch applications. Unlike other log types in AdvaInform History, PDLs do not require any configuration. When the Production Data Log option is installed on an IMS, PDLs are configured automatically by the batch application (Batch 300 or TCL). PDL is an option to AdvaInform History. Some support functions for PDL such as archival of PDL logs are accessible from History menus and are described in the AdvaInform History User's Guide.

1.6 Release History

Version	Description
1.0	The initial release of Advant Station 500 Series IMS software.
1.1	Provides the following new features and enhancements: • Improved performance and stability • Improved user interface. In particular, the error log presentation and SQL*Connect Server configuration has improved functionality and better look and feel. • Improved AdvaInform User API. Object Access Services retrieves information for object instances and object types from the Type Directory. Also a service is now available whereby you can send several commands in one function call. • Persistent name storage supported. This allows for faster start-up as once symbols (objects) are resolved, they do not have to be resolved again after system start-up. • Full support for alarm and event distribution for Master. Alarms and events generated by objects in IMS are presented in OS and MasterView. Alarm acknowledge is also supported. • Master products MasterView and SuperView now have full access to AdvaInform Basic Objects. • The AdvaBuild Central Backup is now available (Master). • Database tables for MOD 300 process object types DATA_FCM and VA_STRING_FCM. They are used in conjunction with SQL*Connect Server and they provide access to the AdvaInform relational database from the MOD 300 operator station. • System messages from AdvaInform are sent to and presented on MOD 300 diagnostic displays.

1.2	Provides the following new features and enhancements: • Improved performance and stability • IMS 1.2 is based upon Oracle7 and Forms4 • HP-UX 9.05. Supports for example hardware for IMS 515/64. • Improved User API. A new set of functions - the DO - REQUEST functions, are provided to simplify programming and improve performance for User API applications. There are now no restrictions on amount of concurrent subscriptions • Language support - for english, swedish and german • IMS User Definition support allows you to define new IMS users. • Distribution of SPC Events to Operator Stations (MOD 300). • System Status support for the new Master controllers. • Improved installation and start-up. Features to support start-up, shut-down, and supervision of Customer/ABB applications. • UPS - Hardware and software to guarantee uninterrupted power supply during shorter power outages. • AdvaInform Event Log, Long term storing of events and alarms from the process into the relational database. Provides user interface to present and to sort the events according to your own requirements (Master). • Improved workstation backup features, Incremental On-Line backup, on demand and on time schedule. Selective restore functionality. • Improved Central Backup facilities allows you to backup your Process equipment on demand and on time schedule (Master). • Tools for dumping and population of your historical, calculation and your user object databases to/from text files. • Additional basic objects providing run time measurement, basic calculations and third party software execution. • A tool for maintenance of Object References is provided. It allows you to monitor the progress of symbol resolution, open up gateways, resolve symbols after moving objects in your network etc. • New Hardware platforms: - Advant Station 515/64 providing 25-30% better performance than Advant Station 515/50. - Advant Station 520i/64 providing better performance and with an ability to endure industrial environments. - Advant Station 530/99 providing doubled performance compared to Advant Station 515/50. • New disks (1 and 2 GByte disks, Raid Disks) • C development option (C license) is included in Basic Unit. • Fast/Wide SCSI disks are provided for AS530. • Cl option (MOD) available

1.3	Provides the following new features and enhancements: • AdvaInform link to MATLAB available • SQL*Net and ODBC option available for both Windows 3, NT and 95. • Replacing AS 530/99 with AS 530/C110 to increase performance • Replacing AS515/64 with AS515/100 to increase performance • CD/ROM available • DOC on CD available • 4GB disks available • File based history providing performance and capacity increase • AdvaInform Reports now supports graphics • Alarm/event distribution for TCL billboard messages (MOD 300)
2.0	Provides the following new features and enhancements: • New licensing system. • New option - AdvaInform SQL*Connect Programming • New option - Programmer 2000 - Pro*C • New option Dataset (Master) • New option - On Line JFS • Based upon HP-UX 10.20 • All the IMS software is installed separate from HP-UX 10.20 • All Advant software is distributed on CD-ROM • New Advant Series hardware available • Node Status display available for AdvaInform Basic Functions MOD 300 • IMS can be bought stand-alone - without RTA hardware. • Netscape FastTrack Web Server - new functionality • AdvaInform History provides an on-line status display and capability for viewing AdvaInform History data on Multibus Consoles (MOD 300) • AdvaInform Reports supports HTML and PDF file formats making the Reports easy to present with a Web Browser. • AdvaTalk Link to MATLAB supports MATLAB 5.0 • AdvaInform Basic Function supports other subscription intervals other than 1,3 and 9 seconds for cyclic subscriptions (Master)

1.7 Terminology

<table>
<tr><th>Term</th><th>Description</th></tr>
<tr><td>3-GL</td><td>Stands for Third Generation Language; a term which refers to languages such as C++ and C.</td></tr>
<tr><td>AdvaInform Basic Objects</td><td>AdvaInform Basic Objects are pre-defined object types for storage of AdvaInform data. They can be logged by History and can be used in AdvaInform applications. They include:
Master process objects such as:
<table>
<tr><td>DI, DO</td><td>Boolean objects (On/Off)</td></tr>
<tr><td>AI, AO</td><td>Floating point objects</td></tr>
<tr><td>TXT</td><td>String objects</td></tr>
<tr><td>DAT</td><td>Boolean, Integer, or Floating point objects</td></tr>
</table>
Application objects such as:
<table>
<tr><td>coExecutor</td><td>Object that executes any program or script in the IMS</td></tr>
<tr><td>coRTM</td><td>Run Time Measurement (Master only)</td></tr>
<tr><td>coBasicCalc</td><td>Object that performs a number of different calculations on 2 to 10 input values.
Examples on calculations: sum, average. (Master only)</td></tr>
</table>
MOD 300 process objects such as:
<table>
<tr><td>DATA_FCM</td><td>Floating point objects</td></tr>
<tr><td>VA_STRING_FCM</td><td>String objects</td></tr>
</table>
You need the AdvaInform Object Handling package to use Basic Objects. This package contains a configurator to instantiate the Basic Objects. It also execute the objects during runtime.</td></tr>
<tr><td>AdvaInform Basic Software</td><td>The collection of AdvaInform Basic Functions, AdvaInform User API, and AdvaInform SQL*Connect together with the Netscape software for Web support.</td></tr>
<tr><td>Advant Station 5xx Hardware User´s Guide</td><td>In this manual it means the hardware manual for the station: Advant Station 515, Advant Station 520, Advant Station 520i or Advant Station 530.</td></tr>
<tr><td>Advant Station 500 Series</td><td>In this manual it means Advant Station 515, Advant Station 520, Advant Station 520i and/or Advant Station 530.</td></tr>
<tr><td>AdvaSoft for Windows</td><td>Is an Advant OCS platform software product.</td></tr>
<tr><td>AMPL</td><td>ABB Master Programming Language.</td></tr>
</table>

Term	**Description**
API (Application Programming Interface)	A set of subroutines that provide a means to establish remote process-to-process communication. AdvaInform User API in AdvaInform Basic Functions allows programs in the HP-UX environment to interact with Advant OCS objects.
Core System	All nodes in the distributed control system communicate with each other through the Core System. The Core System provides services for the system applications. Using these services, the system applications can communicate with each other whether they reside in the same node or in different nodes of different types. The Type Directory, which is part of the Core Directory, contains information on all object types known to the Advant OCS.
DCS	Distributed Control System.
IMS	Information Management Station.
IMS Menu	The menu that provides access to AdvaInform Basic Functions as well as optional functions.
JFS	Journalled File System
LVM	Logical Volume Management
NLS	Native Language Support.
Objects	In AdvaInform software (as well as other Advant technology software) the combination of data and associated procedures (operations that can be applied to the data) are represented by Objects. Objects represent significant elements or functions in the process control/process automation domain. Applications are created by combining these objects. Examples of objects. • Process objects such as CCF loops (MOD 300) or PIDCON (Master) • History logs • Alarm and event lists • AdvaInform basic objects • AdvaInform user objects. Objects protect some of their data for the object's internal use only. Other object data, called attributes, are public and available to other objects or software applications. For example, attributes of process loop objects include the measured value, setpoint value, and base gain. Objects can read attributes in other objects via subscriptions. These subscriptions can read data from the source objects either cyclically, on demand, or when a predefined event occurs.
OCS	Open Control System

Term	**Description**
OS	Abbreviation for Advant Station 500 Series Operator Station.
PL/SQL	Procedural language extension to SQL.
RDBMS	Relational Data Base Management System
RFS	Remote File System
RTA	Real Time Accelerator Board. A communication board installed in an Advant Station for communication on the control network. ABB propriety hardware that adds Real-Time capability to an HP-UX based workstation.
SQL	Structured Query Language. Standard language for queries towards relational databases.
SQL*Net	Product from Oracle Corporation. SQL*Net for TCP/IP is included in AdvaInform Basic Functions. SQL*Net is used to connect the AdvaInform relational database to remote Oracle databases and software tools supporting Oracle. SQL*NET and ODBC options to install on PC:s exist, see the concerning Advant price list.
TCP	Transmission Control Protocol
UPS	Uninterruptible Power Supply
User Objects	User Objects are a means to develop and integrate user applications into AdvaInform. These objects are built using the AdvaBuild Object Type Builder software option. They are instantiated and executed using the AdvaInform Object Handling software option.

1.8 Product Overview

The IMS is an information server for the Advant OCS, and for nodes on the TCP/IP Network. AdvaInform software in the IMS supports information gathering and manipulation. The AdvaInform software gathers, stores, manipulates and presents process and production information to support informed decision making by production management. It is also a platform for integrating both your applications and vendor-supplied applications into the Advant OCS.

The AdvaInform software offers open system features which make it possible to integrate information from all parts of the plant. You can access data consistently, whether the data resides in internal (Advant OCS) nodes or external nodes, or whether it is generated by AdvaInform applications.

The AdvaInform user interface is based on X-technology, so the IMS can act as a server for X-clients on the Plant Network (TCP/IP). Several users can simultaneously access AdvaInform functions from X-clients on the Plant Network. X-technology makes it possible for you to interact with applications that are executing in several nodes on the plant network.

From an X-terminal, you can manage AdvaInform in one terminal window, an order system in a second, and a word processor in a third. The software structure is shown in Figure 1-3.

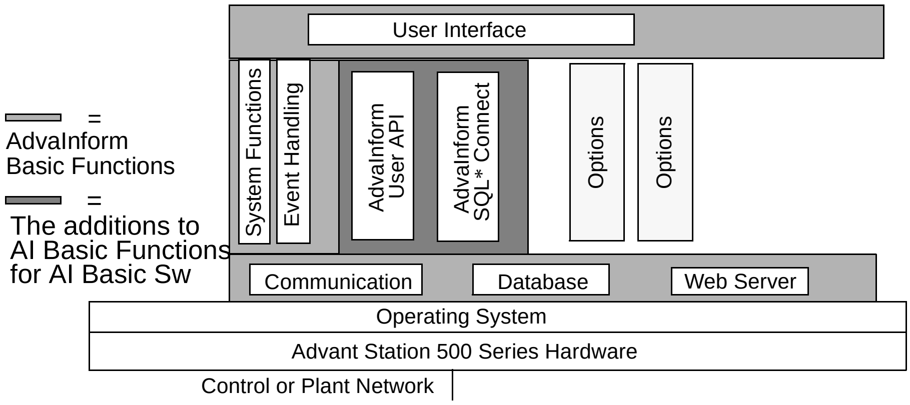


Figure 1-3. AdvaInform Software Structure

The following sections provide a comprehensive description of the capabilities of the AdvaInform Basic Functions and optional software. Some of the supported functions are:

- transfer of data between the IMS and external nodes (computers) on the Plant Network.
- development and integration of applications (your own as well as vendor applications) into the Advant OCS.
- historical data collection and storage.
- configuration, scheduling and execution of reports and calculations.
- configuration and execution of user objects.

1.8.1 AdvaInform Basic Software

The AdvaInform Basic Software consists of AdvaInform Basic Functions, AdvaInform User API and AdvaInform SQL*Connect, Figure 1-3.

AdvaInform Basic Functions consists of:

- a Core System that provides communication services for the system applications.
- a relational database.
- an Alarm & Event Distributor.
- a User Interface system consisting of
  - a Menu system.
  - object presentation displays.
  - a System Status display.
  - system management utilities.
- the Advant OCS communication software providing a tight integration between the AdvaInform, AdvaTalk, AdvaBuild functionality in the information station with other advant nodes and the corresponding controller and operator station software and applications. (optional)

The Web support consists of a Web server NetScape FastTrack and a Web browser - Netscape Navigator. The NetScape FastTrack web server is provided to give your Intranet users access to Advant OCS and the AdvaInform functionality. With a Web Server you get access to the Advant OCS through the reports created with AdvaInform Reports

AdvaInform SQL*Connect provides two basic functions:

- It provides the means for client applications to read data from Advant OCS (Open Control System) objects via SQL (Structured Query Language).
- It provides the means for Advant OCS objects to read data from relational database tables on external nodes.

AdvaInform User API (Application Programmer's Interface) provides a means for your 3GL-application programs to interact with objects in the Advant OCS. A C-licence and C-development software is included in the Basic Functions.

The AdvaInform Basic Software can be installed in three different ways:

- AdvaInform Basic Software - Master
- AdvaInform Basic Software - MOD 300
- AdvaInform Basic Software - Stand-alone

The stand-alone versions are installed without the network communication (the Real Time Accelerator Board and the Advant OCS communication software are excluded). You can use the Stand-alone version when the IMS does not have to be connected to the OCS control network. If you begin with a stand-alone version, and later need to connect the IMS to the control network, you can use an upgrade kit to make a full function AdvaInform Basic Software.

1.8.2 Optional AdvaInform Software

The following optional software can run with AdvaInform Basic Functions in both Master and MOD 300 systems. Many of them also have optional extensions such as extending with another 10, 000 Historical logs.

- AdvaInform History
- AdvaInform Reports
- AdvaInform Object Handling
- AdvaInform SQL*Connect extension
- AdvaInform SQL*Connect programming
- AdvaInform Display
- AdvaBuild Object Type Builder
- AdvaTalk Link to MATLAB
- SQL*Net and ODBC
- X-station option
- Programmer 2000-Pro*C
- On-Line JFS
- UPS (you need to install this software to use the UPS properly)

The following options are Master-specific:

- AdvaInform Calculations
- AdvaInform Event Log
- Dataset
- AdvaBuild Central Backup
- MasterBatch compatibility option

The following options are MOD 300-specific:

- AdvaInform SPC (Statistical Process Control)
- AdvaInform PDL (Production Data Logs)
- AdvaInform CI

1.8.2.1 AdvaInform History

AdvaInform History stores data on disk and provides those data for any data client. Advant OCS object values from any node in the system can be sampled and stored. Historical storage can be long term on disk, or values can be archived to tape for permanent storage. Tape can be stored off site for an extra level of security.

The Historical data is often the base for further evaluation and improvements of your process, and thus for many other software applications.The Advant Station Operator Station as well as AdvaInform Display provide excellent features for Trend presentation, helping you to evaluate and control your process in the most effective way. For more information, refer to the *AdvaInform History User’s Guide.*

1.8.2.2 AdvaInform Reports

AdvaInform Reports is used to generate process reports that contain information from any node in the system including historical information from the History database.

Oracle Reports 2.5 and Oracle Graphics 2.5 are embedded in AdvaInform Reports. The output can be presented on screen and also according to a configured time schedule printed out on printer or stored in files. Optional file formats include HTML and PDF. PDF files can be presented using a Web browser if the files are placed in a file structure maintained by the AdvaInform Web server. For more information, refer to the *AdvaInform Reports User’s Guide*.

1.8.2.3 AdvaInform Object Handling

With AdvaInform Object Handling you can configure and execute IMS applications in the form of User Objects. Object Handling is delivered with some Basic Object Types (AI, AO, DI, DO, DAT and TEXT or DATA_FCM and VA_STRING_FCM) and a number of other useful ready made User Object Types (Runtime Measurement, Calculation and Execution).

AdvaInform Object Handling is also the base for Datasets. For more information, refer to the *AdvaInform Object Handling User’s Guide.*

1.8.2.4 DataSet (Master only)

With the dataset option you can configure and execute the dataset transportation method between other Advant OCS Master nodes and your AdvaInform applications. Dataset gives you the largest transportation capacity correlated to the network traffic load and the CPU load of the involved Advant OCS nodes. Dataset is provided as a User Object type. It requires AdvaInform Object Handling to be installed. You use the Object Handling Configuration tool to configure the dataset objects. For more information, refer to the *AdvaInform Object Handling User's Guide* and the *AdvaInform Object Types Reference Manual* which contains a description of the dataset object type.

1.8.2.5 AdvaInform Calculations (Master only)

You can use AdvaInform Calculations to build and execute calculations in the AdvaInform environment. It is intended for straight forward calculations, with the focus on volume rather than complexity. AdvaInform Calculations is designed to meet the most common requirements for calculations used in such applications as process control.

Input and output to/from the calculations are object data from any AdvaControl or AdvaInform node. For more information, refer to the *AdvaInform Calculations User's Guide.*

1.8.2.6 AdvaInform Event Log (Master only)

You can use the AdvaInform Event Log to enable long term storage of event data. Data on events that take place in controllers and in AdvaInform software are sent to primary logs located in the Advant Station. The purpose of the AdvaInform Event Log is to transfer data from these primary logs to long term storage in the AdvaInform database.

The Event Log presentation display lets you filter and sort the information to make it easier to use. You can also retrieve statistics from the Event Log database. Finally you can build your own applications to evaluate the information using the provided accesses via SQL or AdvaInform User API.

For more information, refer to the *AdvaInform Event Log User's Guide*.

1.8.2.7 AdvaInform SPC (MOD 300 only)

AdvaInform Statistical Process Control (SPC) software is an option to, and must be used in conjunction with, AdvaInform History. SPC provides the means to monitor process variations and determine if the variations are random or systematic. SPC analysis then determines if the variations are within statistical control or outside your user-specified parameters.

SPC produces standard control charts that enable you to analyze the variation of a variable. An SPC alarm is issued when a variable goes out of statistical control. Early detection of systematic variations indicates that there is a problem within the process before the quality of the product is negatively affected. For more information, refer to the *AdvaInform SPC User's Guide*.

1.8.2.8 AdvaInform PDL (MOD 300 only)

AdvaInform Production Data Log (PDL) software is an option to, and must be used in conjunction with, AdvaInform History. A PDL is a History log that stores production data such as batch start/end times, batch variables, and recipe/equipment data for presentation in batch reports. PDLs are created and data are recorded in them either by:

- Taylor Control Language (TCL). TCL batches create PDLs and send information to them via TCL statements.
- Batch 300. Batch 300 jobs and batches create PDLs and send information to them via a combination of entries on the RECORDING section of a Batch 300 recipe, and TCL statements in batch phases.

Data stored in PDLs is accessed via SQL. SQL statements can be entered in a Database Access window in AdvaInform Basic Functions, or batch reports that use SQL statements can be created via AdvaInform Reports. A number of database views have been created specifically for reading PDL data via SQL statements. For more information, refer to the *AdvaInform PDL User's Guide*.

1.8.2.9 AdvaInform CI (MOD 300 only)

This product enables current users of the MOD 300 CI to migrate their applications to the Advant OCS. A server in the IMS allows CI clients in Digital Equipment Corp. (DEC) machines with Open VMS to access Advant OCS data.

1.8.2.10 AdvaInform Display

AdvaInform Display lets you build and view dynamic runtime displays on client nodes connected to an AdvaInform Display server. These displays present runtime process data that would otherwise require AdvaCommand for viewing. For example, you can use AdvaInform Display to build and run a display for viewing trend data collected by AdvaInform History. For more information, refer to the *AdvaInform Display User's Guide.*

1.8.2.11 AdvaInform SQL*Connect

A basic license for the AdvaInform SQL*Connect software is included in the AdvaInform Basic Software. SQL*Connect provides the means for client applications to read data from Advant OCS objects via SQL (Structured Query Language). It also provides the means for Advant OCS objects to read data from relational database tables on external nodes.

To extend the number of objects that you can access through SQL*Connect you have to buy a license corresponding to your needs. For more information about SQL*Connect, see the *AdvaInform SQL*Connect User´s Guide* and Section 1.8.6, Development and Integration of User Applications.

1.8.2.12 AdvaInform SQL*Connect Programming

The AdvaInform SQL*Connect Programming option is available for users having a need to work with advanced Oracle based applications. Most user's who wants to create smaller applications are better off using AdvaInform User API or ODBC / SQL access from PC's.

The AdvaInform SQL*Connect Programming option provides a ´PL/SQL User library to Advant OCS objects accessible for any SQL client.

The option lets you subscribe on object attributes as well as execute Advant OCS object operations as if the objects were relational database entities. You can combine the AdvaInform SQL*Connect Programming option with the Pro*C option and the AdvaInform SQL*Connect functionality included in the AdvaInform Basic Software. Together with the features provided by the relational database itself and SQL*NET, you can build many useful applications. For more information, see *AdvaInform SQL*Connect Programming User´s Guide* and Section 1.8.6, Development and Integration of User Applications.

1.8.2.13 AdvaInform User API

A basic license for the AdvaInform User API software is included in AdvaInform Basic Software. The User API provides a means for your C or C++ application programs to interact with objects in the Advant OCS. For detailed information see the *AdvaInform User API User's Guide* and Section 1.8.6, Development and Integration of User Applications. *AdvaInform Object Types Reference Manual* describes objects accessible from the User API.

1.8.3 Optional AdvaBuild Software

1.8.3.1 AdvaBuild Object Type Builder

AdvaBuild Object Type Builder lets you develop AdvaInform applications originating from ABB, third-parties, or customers. The resulting User Objects are fully integrated into the Advant OCS. The User Objects are configured and executed via the AdvaInform Object Handling option. With both options in your development machine and AdvaInform Object Handling in the target machines makes an optimal runtime and development environment. For detailed information see *AdvaBuild Object Type Builder User's Guide* and Section 1.8.6, Development and Integration of User Applications.

1.8.3.2 AdvaBuild Central Backup (Master only)

Central Backup lets you backup data and applications on nodes (Advant Controller, MasterPiece, MasterView and MasterGate) and restore backed up data to a selected node. Scheduling for backups and manual backups are supported. For more information, refer to the *AdvaBuild Central Backup User's Guide*.

1.8.4 Optional AdvaTalk software

1.8.4.1 AdvaTalk Link to MATLAB

The Link to MATLAB® integrates the power of MATLAB and associated tool-box options into the Advant OCS. The Link to MATLAB is composed of an off-line interface and an on-line interface.

- The off-line interface supports read, write, and log functions that can be invoked from the MATLAB prompt in an asynchronous manner.
- The on-line interface uses MATLAB as a mathematical engine. Through the on-line interface you can execute a MATLAB script or function either cyclically or on a triggered basis. Input data are read from the process at every execution and the result can be used to update objects in the Advant OCS.

For more information refer to *AdvaTalk Link to MATLAB User´s Guide*.

1.8.5 Other Optional software

1.8.5.1 Station Software - Enware

When you connect HP X-terminals to AdvaInform, the X-station software must be installed on at least one Advant Station on the network. The X-station software is available as an option from ABB Industrial Systems. You do not need the X-station software to access AdvaInform from a node that has the ability to act as an X-client. For instance, AdvaCommand includes software for the X-protocol and can act as an X-client toward AdvaInform.

1.8.5.2 SQL*NET and ODBC for Windows 3.11, 95 and NT

According to the license agreement between ABB and Oracle, SQL*NET licenses for Windows must be purchased from ABB. SQL*NET and an ODBC driver for Windows are packaged as an option in the Advant OCS price list. You can order it when you order AdvaInform or later when the need arises.

1.8.5.3 Programmer 2000 - Pro*C

The Programmer 2000 - Pro*C option includes the Oracle Programmer 2000 - Pro*C software. Pro*C is a pre-compiler to C which enables you to use the Pro*C syntax in your C programs. The Pro*C syntax provides all the features required to access the Oracle relational database using SQL and PL/SQL.

The Programmer 2000 - Pro*C option lets you access the relational database from your C and C++ programs. This makes it possible to combine the Pro*C option with AdvaInform SQL*Connect and AdvaInform SQL*Connect Programming. Together with the features provided by the relational database itself and SQL*NET you can build many useful applications.

For more information see the corresponding Oracle manuals which can be ordered through ABB. Also refer to Section 1.8.6, Development and Integration of User Applications.

1.8.5.4 Online JFS

Some applications need to run continuously, 24 hours a day, seven days a week. Yet the systems they run on must still be administered and maintained which often requires at least some down-time. You can use the capabilities of Online JFS to perform certain key administrative tasks on mounted file systems. Because you can perform these tasks on mounted file systems, users on the system can continue to perform their work uninterrupted.

The Online JFS option includes the Hewlett Packard On Line JFS software.

1.8.5.5 MasterBatch compatibility

The MasterBatch compatibility option includes support for RFS communication with MasterBatch. It provides you with the following functionality:

- a remote file server that transfers any record-oriented sequential file (ASCII and binary) between AdvaInform software and any remote node running the RFS protocol. This server is always running to provide remote nodes with the requested file services. Files are transferred on a client-server relationships basis.
- a remote file transfer utility which provides you with a simple user interface for file transfer.

The file transfer is primarily intended for transfer between AdvaInform and MasterBatch. Ftp is recommended between TCP/IP nodes. For more information, see the *Release Notes for MasterBatch compatibility.*

1.8.6 Development and Integration of User Applications

1.8.6.1 Overview

Advant OCS applications in medium and large systems are developed with the following tools, Table 1-3.

Table 1-3. Summary of Development and Integration Tools

Type of Development/Functionality	Advant OCS Tools and Products
Real Time Process Control	Advant Controllers Master applications programmed in AMPL MOD 300 applications developed with CCF, TCL and TLL
Operator Supervision and Control	Operator Stations AdvaCommand Display Builder and various AdvaCommand options.
AdvaInform Presentation. Many users that want to view information from their Advant OCS	AdvaInform Display AdvaInform Display options (builder license, PC client licenses etc.)

Table 1-3. Summary of Development and Integration Tools (Continued)

Type of Development/Functionality	Advant OCS Tools and Products
Presentation of Advant OCS information on the Intranet using a Web Browser	NetScape FastTrack included in AdvaInform Basic Functions + AdvaInform Display + AdvaInform Reports
C programming client applications	AdvaInform User API + C Development license included in AdvaInform Basic Software
Programming client applications accessing the database or Advant OCS through SQL*Connect	Programmer 2000-Pro*C + AdvaInform SQL*Connect + AdvaInform SQL*Connect Programming and/or UNIX scripts
Programming client and server applications in the form of objects	AdvaBuild Object Type Builder + AdvaInform Object Handling (You can use one Object Type Builder in a development machine and distribute the result to many stations that just have Object Handling installed.)
Configuration and simple programming of AdvaInform applications Arithmetical operations	AdvaInform Calculations lets you write calculations and configure their execution without any major programming experience.
Advanced process control and complex mathematical evaluations	AdvaTalk Link to MATLAB lets you make advanced process control applications using MATLAB. (The MATLAB programming can be very advanced)
Configuration/Engineering of AdvaInform	Using all other AdvaInform and AdvaBuild functions/options normally requires a basic understanding of your own process and of computers.

The programming tools require programming experience and a good understanding of modern programming concepts such as object orientation, object terminology and client-server concept.

The supported programming languages are C, C++ and Pro*C. Other programming languages can be used but they are not directly supported from the platform product.

1.8.6.2 Examples

Examples for the tools described in this document are provided under the directory:

`/opt/advant/Toolname/examples`

The examples can help you get started. Most User API examples are small utilities in themselves, and can sometimes be used as a basis for your own applications. You can extend them to build your own tools with very little effort.

1.8.6.3 Make and Script Files for Your Convenience

Make and script files are provided with the examples, wherever relevant. Look for files with *Make* or *build* as part of the file name.

1.8.6.4 AdvaInform File Structure - Applications

See Appendix B, IMS File System.

1.8.6.5 Rules for Your Data Files

A good rule is to always place the data files under the directories **`/home/opt/advant/customer/`**. The structure under that directory shows you how to name the directories and files.

1.8.6.6 AdvaInform Basic Software

The application development tools provided with the AdvaInform Basic Software are the AdvaInform User API (Application Programming Interface) and the SQL services including the AdvaInform SQL*Connect. AdvaInform Basic Functions provides application portability between different Advant Station platforms and system generations. New applications developed on the platform have the same access to system functions as system applications, thus giving full but controlled access to system services.

The main function of the Basic Software development tools is to provide access to the process database and AdvaInform relational database through a third generation programming language (3-GL) and SQL interface.

AdvaInform User API

AdvaInform User API provides a C library with all the functions that you need to program C/C++ applications towards the Advant OCS objects. The User API provides application portability between different Advant Station platforms and system generations.

The Advant OCS platform provides an object communication based upon the following:

- The majority of all functionality is provided as *objects*. To access an object you use the *objects name* or a unique identity of the object - the *OID* - which is resolved using the object name. There are a number of *object types* defined in the Advant OCS concept. All objects are of one of those object types. An object type is defined by the way its *attributes*, *operations* and *events* are defined.

  The public information of a function is provided through the object attributes. To read the object attributes you use a *subscription*. There are three ways to request a subscription:

  – *On Demand* - One shot request

  – *Cyclic* - You ask for the data to be returned at cyclic intervals

  – *On Event* - You ask for the data to be returned when certain things (event) occur

  All functions that an object may perform such as updating one of its attributes with a new value, or performing a calculation, is declared for the object type as an *operation*. To make an object perform a function, you send a request to it to perform the appropriate *operation*.

SQL functionality

This describes the SQL functionality provided by the AdvaInform relational database, SQL*NET, AdvaInform SQL*Connect and AdvaInform SQL*Connect programming.

The SQL services provide access to:

- the Advant OCS process database. AdvaInform SQL*Connect provides all AdvaInform users with read access through the AdvaInform relational database to the distributed process database in the Advant OCS. Through the AdvaInform SQL*Connect Programming option, application programs get full access also to all operations of Advant OCS objects - that is a write capability is provided.
- data stored in the AdvaInform relational database.
- data stored in Oracle databases on the Plant Network via the AdvaInform relational database and SQL*Net.
- the AdvaInform relational database from tools on the Plant Network, ordinary Advant OCS applications and so on.

1.8.6.7 User Objects

The Advant OCS is an object oriented system. Pre-defined objects are provided to support data collection, process control and supervision, system status, long term data storage, and so on.

For any Advant OCS user, it is also important that application specific problems can be solved. The most powerful method for application development in AdvaInform is User Objects. User Object functionality is supported by two separate options: AdvaBuild Object Type Builder and AdvaInform Object Handling.

The Object Type Builder is the development environment. It is a complete environment for design and implementation of applications as objects. The result of this development is Object Types which are exported to the Object Handling option. Thus, many IMS nodes with User Objects can be served by one development machine containing Object Type Builder.

Object Handling provides the tools for configuration, execution and monitoring of User Objects. Some pre-defined User Objects, called Basic Objects are included in Object Handling. Master Process Objects such as AI, AO - Analog Input/Output, DI,DO - Digital Input/Output, Text - Text Objects, DAT - general purpose data storage object, 4 data formats.

- MOD 300 Process Objects such as DATA_FCM - general purpose data storage and VA_STRING_FCM - text object. (MOD 300)

  These Basic Objects can be used for several purposes such as:

  - Local storage - distributed access and event and alarm handling
  - SCADA database
- coExecutor objects - Encapsulation and execution of applications
- coRTM objects provide a basic run time measurement functionality
- coBasicCalc - Simple, high performance calculations

These, together with the application specific User Objects built for the plant are executed via Object Handling.

See the *AdvaBuild Object Type Builder User’s Guide* and *AdvaInform Object Handling User’s Guide* for detailed information about User Objects.

1.8.6.8 Calculations (Master only)

The AdvaInform Calculations option provides a fast and convenient method to build applications as calculations. A number of inputs can be read and treated in an algorithm. The results are stored in Process Objects of type AI, AO, DAT, DI and DO. These process objects may reside in the Controllers, making the Calculations a means to produce setpoints to the process. They may also be local to IMS (so called Basic Objects). In that case they are mostly storage for the calculation results. Through the Basic Objects, the results are available for Operator Station presentation, SQL access and access from other applications such as User API programs, History, User Objects and other Calculations. With appropriate configuration the Basic Objects can generate events and alarms if results from the calculations are outside expected limits.

Calculations can be activated in two ways, by scheduling and by triggering. Both methods may be used at the same time for a certain calculation. Chaining means that an output to a DI object from one calculation can be used to trigger another calculation using that DI as trigger input.

1.8.6.9 Comparison of Development Tools

Client applications - Access to OCS objects

All tools described above can be used to build client applications. There are two types of client accesses to other objects:

- Reading (subscribe on) data from objects
- Writing data, that is sending operations to be executed by objects

Every read access from SQL is on demand, SQL does not support any other access methods. The SQL Connect Programming and User API also provides features for data subscriptions on cyclic intervals, on event and provide execution of operations.

AdvaInform Object Handling and AdvaInform Calculations, provide execution of the final applications on cyclic intervals, on events, and as a result of other objects requesting operations to be executed.

Performance using one or the other method (disregarding dataset)

The User API Do Request is the most cost effective way to transport a large amount of data into AdvaInform if Dataset (Master) is disregarded.

User Objects with many connections are also very cost effective for transport of a large amount of data. User Objects also provide scheduling and configuration.

This should be compared with the simplicity of building a Calculation within a few minutes or programming a User API program in a number of hours or the convenience in just making a select statement on the fly. A general rule of thumb is that the more often a data transportation occurs, the more efficient method you should use. When you compare the different methods also keep in mind that there are differences in the tests.

Server support

A server support is required if you want to provide access from other client applications/functions to your results.

The only tool that includes a complete server support is AdvaBuild Object Type Builder. All User Object attributes can be read both through ordinary core system services used by such applications as AdvaInform History, AdvaCommand Displays and through SQL.

Furthermore, all operations defined for a User Object can be called by other applications. This makes it possible to:

- Perform a dialog from an AdvaCommand Display
- Interact between several applications (User Objects) which together create a more comprehensive application.

User API applications and Calculations may store their results in Basic Objects, either resident in AdvaInform Object Handling or in an Advant Controller. As those objects provide a server access this means that the results can be read by any core system client.

Furthermore, all operations defined for the Calculation Object can be called by other applications.

Accessing all types of data, Accessing History Logs

User API and SQL*Connect Programming are currently the only tools that provide complete access to all kinds of objects and object attributes. Objects having any attribute of the data types struct, union, array, open array or combinations thereof can not be accessed from SQL nor from User Objects.

SQL*Connect does not support access to all kinds of Historical data. User Objects do not support History accesses. This means that complete access to Historical data and also to operations towards Historical logs (write) must be performed with the help of User API or SQL*Connect Programming applications. Please note however that User Objects can access these data through calls to User API library routines.

Creation of Events and Alarms, Alarm acknowledgment

MOD 300 TCL Billboard messages can be created in AdvaInform. All tools that can send operations to other objects can also support the TCL Billboard messages. Support for this is provided in the AdvaBuild Object Type Builder.

Master events as well as alarms can be created in AdvaInform. The AdvaInform Basic Function provides an object for event and alarm distribution. Support for this is provided in AdvaBuild Object Type Builder. You can create events and alarms from User Objects.

User API and SQL*Connect Programming applications can create events but not alarms, as alarms require server functionality to take care of the acknowledge requests. See the description of the object type EADISTR in the *AdvaInform Object Type Reference Manual* for details on how to generate events.

Alarm acknowledgment is supported by the Basic Objects and by any User Objects that emulate the alarm behavior of the AI object type.

Configuration of instances, On Line and Bulk

AdvaInform Object Handling and Calculations provide configuration tools to configure, start and stop individual instances. They also include bulk load utilities to instantiate hundreds of objects/calculations in a short time.

The load and dump utilities can be used to dump an in-house configuration on file and then load it into the target system. The source code format can also be used to build the database from customer specifications without doing on-line configuration - which is more time consuming.

There are no such facilities for User API. Whether configuration functionality exists for Third Party Tools using SQL access depends on the third party tool. Depending on the application there might not be a need for such functionality.

Scheduled execution facilities

Some applications must to be able to execute on a schedule, for example, every five minutes, every hour, once a day (10 o’clock), once a week, once a month and so on. Such functionality is automatically provided for all User Objects and Calculations instances and can be configured according to their needs.

AdvaInform Object Handling provides an object type, coExecutor, which can be configured to execute any HP-UX program, including supply of parameters to the program. As the coExecutor can be configured to execute on cyclic intervals, on event and as a result of a request to execute an operation, a combination of such an object and ordinary SQL client access programs or User API programs can provide necessary execution flexibility.

Process Supervision, Start-Up, Shut Down

The AdvaInform Basic Functions provides a configuration tool which allows you to configure the Start-up, Shut Down and Supervision of your applications. They will be executed just as any other AdvaInform programs. If the execution schedule is not sufficient you can use the coExecutor object described in Section 1.8.6.7, User Objects.

Application Packaging

Applications built with the client tools - User API, SQL*Plus and third party development tools generally result in executable files and require none or very little packaging work. The tools described in Section 3.6.3, Process Supervision are generally sufficient.

The AdvaBuild Object Type Builder provides packaging facilities that let you to develop an application in one AdvaInform node and distribute the results to another provided that AdvaInform Object Handling is installed on that machine.

Data Distribution over Plant Network to external nodes

Applications using SQL can access data from AdvaInform/Advant OCS using the relational database distribution. This is two-directional, applications can ask for data from machines outside the Advant OCS as long as they provide SQL access.

Table 1-4 provides a comparison of tools for application development and integration.

Table 1-4. Comparison of methods for application development

Feature/Characteristic	User Objects	User API Object Access Services	SQL services including SQL*Connect programming	Calculations (Master only)
Read access towards the process database.	yes	yes	yes	yes
Write access towards the process database.	yes	yes	yes	yes
Access to History data	only through User API calls	yes	yes	no
Used for large scale applications with demand on high performance towards Advant OCS.	yes	yes	no	no
Used for integration of existing vendor supplied solutions.	yes	yes	yes	no
Includes full server functionality for integrated solutions. For instance AdvaCommand® User Interface can subscribe towards the application and AdvaInform History can subscribe on results.	yes	no(1)	no	no(1)
Support for creation of Events	yes	yes	yes	yes(2)
Support for alarm creation, alarm acknowledgment	yes	no	no	partly (2)
Provides means to run applications in external node on the Plant Network and interact with the Advant OCS.	no	no	yes	no
Support for instance configuration and bulk configuration	yes	no	no	yes
Support for scheduled execution	yes	no	no	yes
Support for application packaging/distribution	yes	no	no	no
Require programming skills	yes	yes	yes and no(3)	no

(1) If Basic Objects are used as storage the results can be accessed by all clients
(2) Through Basic Objects
(3) For more complicated applications, Pro*C and Forms implementation programming skills are required

Advantages using User Objects

Advantages for using User Objects are:

- With User Objects you can make applications totally integrated into the Advant OCS.
- User Objects provide server functionality. This functionality is required if other applications need to subscribe on data from your application or interact with it.
- The Object Type Builder and Object Handling make it easy to configure, start, and stop instances of an application. The only other tool that supports instance configuration is Calculations.
- User Objects provide facilities to build and install the resulting run time environment that executes your application. The resulting application can be exported to another AdvaInform node.
- With the option dataset - which is a User Object type - performance for exchanging data with AdvaControl becomes very high but with a low communication traffic load.
- Once you have learned how to work with User Objects, the productivity when creating new applications is considerably higher compared with AdvaInform User API.
- Development time is reduced since the same code can be used by several User Objects.
- Scheduled execution, on cyclic intervals, on absolute times or event driven are features that you get without additional effort when you configure User Objects. If you want a similar functionality in a User API program you must do all that implementation by yourself.[1]

Advantages using User API Object Access Services

Advantages for using User API Object Access Services are:

- The User Objects do not yet support all data types. Examples of data types not yet supported are arrays and open arrays. Furthermore, User Objects do not currently support storage directly into History.
- If you need to read a large amount of data in a short time and on short cyclic intervals, the Object Access Services generate less CPU load than User Objects.

Advantages using User Objects and User API together

The User API library can be used from User Objects. Combining the advantages of both is the best approach to application development.

---

[1] Cyclic subscriptions are supported by User API Object Access Services. They cover some cyclic execution requirements.

Comparison AdvaInform Calculations and User Objects

The following is a comparison of AdvaInform Calculations and User Objects:

- Calculations do not require any programming skills. Within a few minutes you can successfully execute your first Calculation. To implement User Objects requires programming skills. To configure ready-made User Objects however is comparable with the configuration of Calculations.
- User Object run time performance is slightly better than the performance for Calculations.
- You can implement any method you like in a user object and also store the result in the objects attributes. The calculation object is fixed, you can only change the executed algorithm. Calculation output is stored into basic objects.

Advantages using SQL functionality

Typical applications that are suitable for, and may even require one or more SQL functions are:

- Read relational data from external relational databases over SQL*NET (typical recipes, product planning information) and use the data to update process control parameters.
- Read information from the Advant system (historical information, object attributes) and write that information into an external database using SQL*NET.
- Combinations of the two cases above.

The Programmer 2000 - Pro*C option includes the Oracle Programmer 2000 - Pro*C software. The Pro*C syntax provides all the features required to access the Oracle relational database using SQL and PL/SQL.

The Programmer 2000 - Pro*C option will allow you to access the relational database from your C and C++ programs. This makes it possible to combine the Pro*C option with AdvaInform SQL*Connect functionality and AdvaInform SQL*Connect Programming option. Together with the features provided by the relational database itself and SQL*NET you can build many useful applications.

Using Pro*C and thus creating C programs to execute your database accesses is normally much more effective than writing Scripts executing PL/SQL or SQL.

1.8.7 Hardware Options

You can connect X-Terminals to AdvaInform nodes. Each X-terminal requires additional memory as described in Chapter 2, Installation. Depending on the purpose of the X-terminal session, additional CPU power may also be consumed. The number of X-terminals that you can connect is limited by the actions performed by the users and by the type of Advant Station you are using.

You can also connect printers, primary memory, and disk drives as required to support your application. Printers and X-Terminals can be system resources shared on the Plant Network. See Chapter 2, Installation for details.

Hardware options for the IMS are as follows:

- Monitors
- X-terminals
- Communication - Transceiver set & Cables
- Printers
- Data storage
    - Disks and tape units
    - CD-ROM readers
    - Memory
- UPS - Uninterruptible Power System - To make use of the UPS the UPS software has to be installed.

Chapter 2 Installation

2.1 Site Planning and Environment

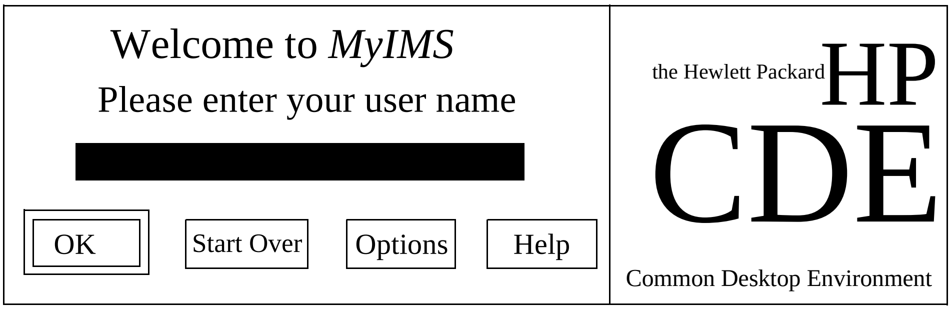
Refer to the *Advant Station 5xx*[1] *Hardware User's Guide* for information regarding:

- site planning and environmental considerations.
- hardware set-up and installation.

2.2 Start-up Procedures

Start-up involves simply powering up the Advant Station as described in the applicable *Advant Station 5xx Hardware User's Guide*.

When the Advant Station has finished booting, the HP CDE Login screen is displayed, Figure 2-1.



Welcome to *MyIMS*

Please enter your user name

Figure 2-1. The first HP CDE Login Screen

If your Advant Station already has the AdvaInform Basic Functions or other Advant Station application software installed, you can log in to the IMS menu as described in Section 2.2.1, How to Log Into the IMS Menu, or log into any AdvaInform application as described in the applicable user's guide.

If the software is not already loaded, refer to Section 2.4, Installation Procedures.

For Re-start of the AdvaInform software manually see Section 2.10, How to Re-start AdvaInform Software Manually.

---

[1] 5xx stands for 515, 520, 520i or 530.

2.2.1 How to Log Into the IMS Menu

This section provides abbreviated instructions for logging into the IMS menu so you can access specific IMS menu functions described in this book. All procedures described in this book require access at the SYSTEM level, for example ocsmgr user. More explicit login instructions are provided in the *AdvaInform Basic Functions User's Guide*.

To log into the IMS menu:

1. Enter the IMS user name in the Login field in the HP CDE window then click **OK** (or press <**Return**>). This displays a second dialog box.
2. Enter the password and click **OK** (or press <**Return**>). This opens the HP CDE environment.

NOTE

If the IMS menu start-up command is included in your log-in file, the IMS menu will be opened automatically when you log in to HP-UX. Otherwise continue with step 3.

3. Open the IMS menu. Either press the IMS menu Icon (Section 2.2.2, IMS Menu Icon) or open a terminal window and enter: **IMSmenu** at the $ prompt, and then press <**Return**>.

   This opens the IMS menu, Figure 2-2

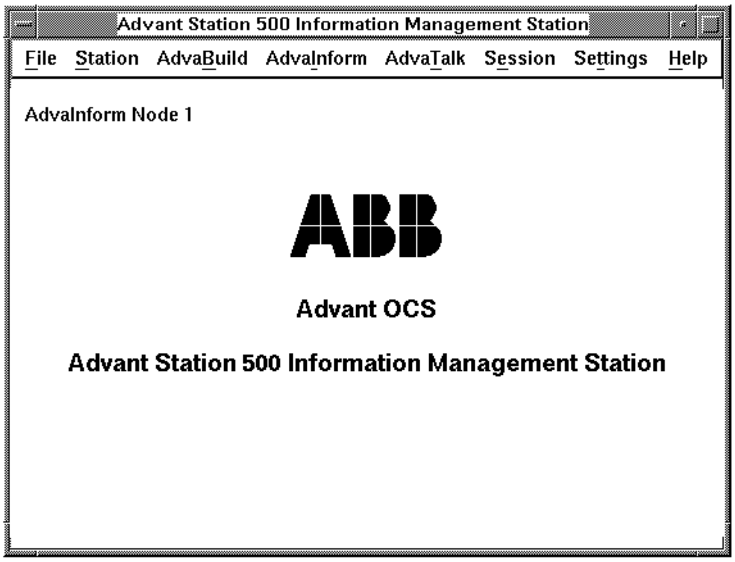

Advant Station 500 Information Management Station
File
Station
AdvaBuild
AdvaInform
AdvaTalk
Session
Settings
Help
AdvaInform Node 1
ABB
Advant OCS
Advant Station 500 Information Management Station

Figure 2-2. IMS menu

2.2.2 IMS Menu Icon

The IMS menu icon indicates whether or not the AdvaInform software is running. If the IMS menu icon is filled, Figure 2-3, all necessary processes are up and running. If the icon is transparent, AdvaInform is either stopped or in the process of starting up.

The IMS menu icon can also be used as an alternative to the command line method for opening the IMS menu. The icon is available if an IMS user exists with the same user name as the operating system user, you are logged in as.

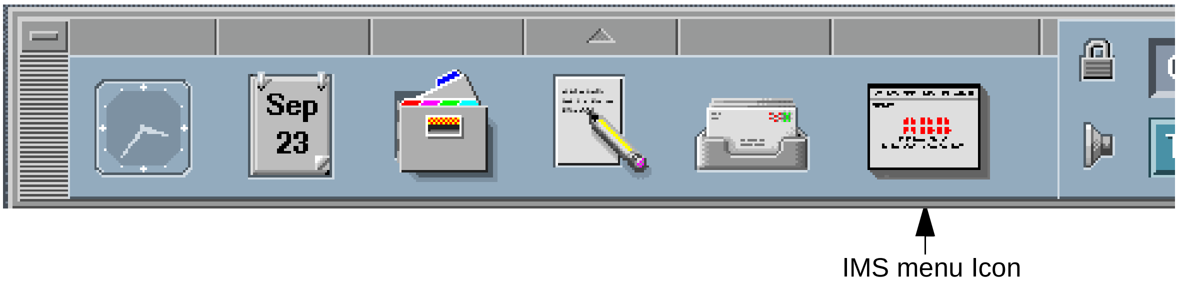


Figure 2-3. IMS menu Icon

2.3 Shutdown Procedures

You can shut down the Advant Station on two levels. You can simply stop AdvaInform processes and leave the Advant Station powered up, or you can stop the AdvaInform processes and power down the Advant Station.

2.3.1 How to Stop AdvaInform Processes

To stop the AdvaInform processes:

1. Open a terminal window and log in as the superuser (root).
    a. At the $ prompt, enter: **su root**
    b. Enter your root password.
2. Enter: /**`opt/advant/Startup/bin/IMSstop -oracle -v`**

    The -oracle option shuts down the Oracle database. If -oracle is left out, Oracle is not stopped.

    The -v option executes the script in verbose mode. Messages are presented on the screen.
3. At the # prompt, enter: **exit** to exit session as root user.

NOTE

If the IMS is shut down in an uncontrolled way, the relational database may crash and the data may become corrupt. If the IMS has to be rebooted, use the `HP-UX` `shutdown` command. This command executes the `IMSstop` script.

2.3.2 Power Down

This procedure automatically stops the AdvaInform processes as well as shutting down the Advant Station.

To power down the Advant Station:

1. At the prompt, enter: **su root** followed by the root password.
2. At the root prompt (#), enter: **/usr/sbin/shutdown -h 0**

   -h means halt station.

   0 means zero seconds to shutdown.
3. When shutdown has finished, turn power off at the Advant Station and peripherals in this order:

   System Unit
   Printers
   External Mass Memory System
   DAT Drives
   Monitor
   UPS

   To determine the location of the Power On/Standby switch for the Advant Station refer to the applicable *Advant Station 5xx*[1] *Hardware User's Guide*. As an example, the Power On/Standby switch for AS520 it is located on the right side of the System Unit.

WARNING

Do not assume that all power to the computer is off just because the power on/standby switch has been turned off. To completely remove power from your computer, unplug the power cable from the power outlet.

---

[1] 5xx stands for 515, 520, 520i or 530.

2.4 Installation Procedures

The IMS is delivered with the operating system and applicable AdvaInform software already installed; therefore, software installation is generally not required upon delivery. Software installation is required under the following conditions:

- In case of a total hard disk failure. This requires a complete installation of HP-UX 10.20 and AdvaInform software. This procedure clears all existing software and data on the hard disk(s).
- When you upgrade an existing IMS with a new version of the software that is already installed. There are two types of upgrade:
  - Major upgrade of base software and software options. This procedure is similar to complete installation in that it clears all existing software and data on the hard disk(s). Prior to performing such an upgrade YOU MUST back up all your application programs/data files under `/products/data/customer/`, as well as all third party software and data files. When you are finished with the upgrade you must restore the application data that you previously backed up.
  - Incremental upgrade of one or more software packages. An incremental upgrade (or patch) can be performed without erasing the contents of the hard disk. Therefore, backup and restore of application data is not included in this procedure. Specific instructions for incremental upgrades are provided in the release notes delivered with the upgrade software. General instructions are provided in Section 2.5, How to Install Software Options or Patches.

This section describes how to install software on your IMS when you have to perform a complete installation of HP-UX 10.20 and AdvaInform software, or when you are performing a major upgrade. In either case, this procedure clears all existing software and data on the hard disk(s).

NOTE

It is recommended that you perform a full system backup as described in Section 5.7, Backup and Restore prior to installing any software on your IMS. This way, in the event that the installation or upgrade fails, you can restore your system to its original state before the installation/upgrade.

Some of the steps that you perform for an upgrade are not applicable for a straight installation. Section 2.4.1, Quick Reference for Upgrade and Installation Procedures provides a quick overview of the steps required for these two similar procedures.

2.4.1 Quick Reference for Upgrade and Installation Procedures

CAUTION

Installing HP-UX 10.20 for an upgrade or new installation completely erases all information on your disks. You MUST save all application programs/data files under /products/data/customer/ and take care of all third party software and data files BEFORE you install HP-UX 10.20.

2.4.1.1 Upgrade

NOTE

Your Advant Station must already be at AdvaInform Basic Functions version 1.3/n before you can upgrade to version 2.0.

The steps for performing an upgrade are as follows:

1. Calculate primary memory and disk space requirements (Section 2.4.2, Calculate Required Primary Memory and Section 2.4.3, Calculate Required Disk Space).
2. Prepare for upgrade (Section 2.4.5, Prepare for Upgrade). This involves:
   - verifying that you have the necessary licenses for the software you are installing.
   - documenting your current printer and time synchronization configurations. These will have to be reconfigured after the upgrade.
   - making sure that all application, configuration, and runtime data that you need to save resides in the correct directory where the upgrade wizard can find it.
3. Perform a full backup.
4. Run the Upgrade wizard to save your application, configuration, and runtime data to tape.
5. Perform any changes to the hardware (such as adding hard disks) as required.
6. Install HP-UX 10.20 (Section 2.4.7, How to Install HP-UX 10.20 and HP Options).
7. Install AdvaInform Basic Functions and options that you are entitled to install (Section 2.4.8, AdvaInform Software Installation).
8. Perform required post installation procedures (Section 2.4.9, Post Installation Procedures).
9. Perform post upgrade procedures (Section 2.4.10, Post-Upgrade Work). Use the Upgrade wizard to restore application and configuration data that was backed up in step 4. Other post installation procedures may be required depending on the installed software packages.

NOTE

When you are finished with the upgrade, the imsmgr user has been replaced with ocsmgr, and the imsegr and imsopr users have been removed.

2.4.1.2 New Installation

The steps for performing a new installation are as follows:

1. Calculate primary memory and disk space requirements (Section 2.4.2, Calculate Required Primary Memory and Section 2.4.3, Calculate Required Disk Space).
2. Perform any changes to the hardware (such as adding hard disks) as required.
3. Install HP-UX 10.20 (Section 2.4.7, How to Install HP-UX 10.20 and HP Options).
4. Install AdvaInform Basic Functions and options that you are entitled to install (Section 2.4.8, AdvaInform Software Installation).
5. Perform required post installation procedures (Section 2.4.9, Post Installation Procedures).

2.4.2 Calculate Required Primary Memory

Calculate the required primary memory requirements for the AdvaInform, AdvaBuild and Advatalk software from Table 2-1. Functions that do not require extra memory are not represented in the table. If your calculations show that you need to add memory, order more through your local ABB representative.

Table 2-1. Primary memory requirements

Description	Recommended Primary memory in MB Master	Recommended Primary memory in MB MOD 300
HP-UX including patches and C ANSII developer + AI Basic Functions w/SQL*Connect and User API(1)	64	64
AI History, Basic	+ 16	+ 16
AI History, additions - (depend on type of History log) (also see Memory Extensions below)	+ 8 (10,000 increment) +32 (50,000 increment)	+ 8 (10,000 increment) +32 (50,000 increment)
AI Reports	+ 16	+ 16
AI Event Log	+ 8	
AI Event Log Large	+ 8	
AI Object Handling (also see Memory Extensions below)	+ 8	+ 8
AdvaBuild Object Type Builder	+ 8	+ 8
Dataset	+ 1	
UPS	+ 1	+ 1
AI Calculations	+ 8	
AI Display	+ 8	+ 8
AT Link to MATLAB	+ 8	+ 8
X-terminals concurrently used	+ 8 * no of X-terminals	+ 8 * no of X-terminals
16 concurrent database users(2)	+ 16	+ 16
32 concurrent database users	+ 48	+ 48

(1) If you use the HP OnLine JFS option, you will require additional primary memory based on the total amount of disk space.
(2) This requirement (16 MB) depends on the type of database client to be used. If all clients execute Forms displays in the Advant Station, more memory is required. If the database clients are PC clients requesting data over SQL*NET, this is normally sufficient.

NOTE

If more than 256MB RAM is installed you must increase the kernel parameter maxswapchunks from 256 (default) to 350. You can use Maintenance - Kernel Configuration - Configurable Parameters to change the maxswapchunk parameter.

2.4.2.1 Memory Extensions For User Objects and History

AdvaInform History and the AdvaInform options based on User Objects (AdvaInform Object Handling, Calculations, Reports, Link to MATLAB and Dataset) may require that you extend the shared memory allocated by the core system, depending on your configuration.

You need to calculate OMF shared memory requirements, and then use the results to increase the OMF shared memory specification in the OMF config.cfg file. This is a post-installation procedure and is described in Section 2.4.9.5, Updating the OMF config.cfg File.

Calculation For Options Based on User Objects

The following parameters need to be considered for options based on User Objects:

- number of instances, each occupies about 420 bytes
- number of active input object connections, each occupies about 600 bytes
- number of active input single connections, each occupies about 400 bytes
- number of active input triggered object connections, each occupies about 1500 bytes
- number of active output connections, each occupies about 1500 bytes

The following information is required for each option:

- All these types of input and output are used in Object Handling. Which ones are used depends on the object type.
- In AdvaInform Calculations inputs are single connections and the outputs output connections.
- In AdvaInform Reports a triggered input connection can be used (if triggered activation is active).
- In AdvaTalk Link to MATLAB the inputs are single connections and the outputs output connections.
- Datasets have 1-24 object connections for each sending Dataset and 1-24 output connections for each receiving dataset that stores the information in local DAT objects.

Example

AdvaInform Object Handling:

1000 Basic Objects
400 coBasicCalc with about 6 inputs/instance
150 coRTM objects (1 triggered input)

AdvaInform Calculations:

200 Calculations with 6 inputs, 1 output
50 Calculations with 20 float inputs, one triggered input and one output

AdvaTalk Link to MATLAB:

50 Objects with 20 float inputs and one output

AdvaInform Reports:

40 Reports whereof 10 have triggered activation

Dataset:

10 Datasets, each one with 24 outputs to local DAT objects

Table 2-2 provides a method for calculating the required additional memory for this example. When the above data are entered in Table 2-2, the result is that approximately 4 MB of memory needs to be added to the core system configuration file.

Table 2-2. Example - Core memory requirements for functions based on User Objects

Option	**# of instances x 420**	**# of object connections x 600**	**# of single connections x 400**	**# of triggered input connections x 1500**	**# of output connections x 1500**	**Total**
AI Object Handling Basic Objects	1000x420= 420 kb					420 kb
AI Object Handling coBasicCalc obj	400x420= 168 kb		400x6x400= 960 000 kb			1128 kb
AI Object Handling coRTM objects	150x420= 63 kb			150x1500= 225 kb		288 kb
AI Calculations	200x420= 84 kb		200x6x400= 480 kb		200x1500= 300 kb	864 kb
AI Calculations	50x420= 21 kb		50x20x400= 400 kb	50x1500= 75 kb	50x1500= 75 kb	571 kb
AT Link to MATLAB	50x420= 21 kb		50x20x400= 400 kb		50x1500= 75 kb	496 kb
AI Reports	40x420= 17 kb			10x1500= 15 kb		32 kb
Dataset	10x420= 4.2 kb				10x24x1500= 360 kb	364.2
TOTAL						4163

Calculation for AdvaInform History

The following parameters need to be considered for AdvaInform History:

- Memory allocation for the following types of History objects is 320 bytes per object:
  - Restored logs
  - Log Sets
  - Archive groups
  - PDLs
  - SPC logs
  - Log groups
  - A few internal History objects

NOTE

Numeric and composite logs normally do NOT allocate any shared memory.

- Object accesses
  - A Historical log with a local data source allocates about 1000 bytes of shared memory
  - A Historical log with a remote data source (other than TTD) allocates 1000 bytes of shared memory.
- TTD access (Master) requires 1 MB total for all TTD accesses (independent on number of logs).

Example

For a system with:

- the following History objects (320 bytes per object):
  - 4 message logs
  - 12 log sets
  - 5 log groups
  - 5 archive group
  - 200 restored logs
- Object Accesses:
  - 400 local access
  - 100 remote access
- 4000 secondary logs
- 6000 TTD accesses

Table 2-3 provides a method for calculating the required additional memory for this example. When the above data are entered in Table 2-3, the result is that approximately 1.6 MB of memory needs to be added to the core system configuration file.

Table 2-3. Required memory for AdvaInform History

Category		**Qty * Bytes**	**Result in KB**
History Objects (320 bytes/object)	Restored logs	200 * 320	64
	Log Set	12 * 320	3.5
	Archive groups	5 * 320	1.6
	PDLs	0 * 320	0
	Log Groups	5 * 320	1.6
	Internal objects	10 * 320	3.2
	Message Logs	4 * 320	1.28
Numeric Logs (No space requirement)	Secondary logs	4000 * 0	0
	Composite logs	6500 * 0	0
Object Access (1000 bytes/object)	Local object logs	400 * 1000	400
	Remote object logs	100 * 1000)	100
TTD Access - 1 MB	**yes**		1000
Total		**1.575 MB**	

Using Results of Example Calculations

The results for the two example calculations are as follows:

- for options based on User Objects = 4 MB
- for options based on AdvaInform History = 1.6 MB

Therefore the total OMF shared memory size for this system must be specified as 5.6 MB.

2.4.3 Calculate Required Disk Space

Calculate the required disk space from Table 2-4, Table 2-5 and Table 2-6.

Table 2-4 indicates the recommended minimum swap space based on the size of your primary memory. As a rule of thumb, you should allocate a swap space which is at least 2.5 times larger than the maximum primary memory that you intend to install now or in the future. The swap space should be distributed on several disks if you have more than one.

Table 2-4. Pre-configured/Recommended swap space

Size of primary memory	Recommended minimum Swap
expected maximum less or equal to 128	320 MB
expected maximum 129 to 192	480 MB
expected maximum 193 to 256	640 MB
expected maximum 257 to 384	960 MB

Table 2-5 indicates the recommended starting size of your logical volumes. For the /opt and /home logical volumes, use Table 2-6 to determine whether or not these recommended starting sizes are large enough.

Table 2-5. Default Disk Usage - LVM and Swap

Disk (s)	Swap(1)	Recommended Logical Volume Configuration, MB							Total (Dep. on Swap size)(2)
		/	stand(3)	var(4)	usr	tmp	opt	home	
2 GB or 2 x 1 GB disks	320	84	48	208	376	32	484	440	1992
2 GB or 2 x 1 GB disks	480	84	48	208	376	32	484	280	1992
4 GB or 2 x 2 GB disks	320-480	84	48	250	376	52	600	1600	3330-3490
4 GB or 2 x 2 GB disks	640-960	84	48	250	376	52	600	1400	3450-3770
2 GB + 4 GB or larger(5)	320-960	84	48	300	376	100	1000	3000	5228-5868

(1) For multiple-disk systems, HP recommends that you distribute swap space between two disks. The easiest way to do this is to allocate half the recommended swap space during the installation of HP-UX 10.20, and then the other half via SAM after all HP patches and applications have been installed. See Section 2.4.7, How to Install HP-UX 10.20 and HP Options.

(2) It is strongly recommended that you DO NOT allocate free disk space to any of the logical volumes until you are sure that all the logical volumes have at least the minimum space required to support their respective software applications according to Table 2-6. This will make it easier to use the `lvextend` command in the event that you need to extend a logical volume after installation.

(3) If you want to add some of the HP diagnostics and application programs, verify with Table 2-6 how much extra space is needed.

(4) The size of var and usr may have to be extended if more HP-UX patches are required later on.

(5) When you buy larger disks, how you use them is up to you. The minimum requirements for AdvaInform 2.0 are fulfilled and where you want to increase the space is up to you. Thus, it is only with 1 and 2 GB disks that ABB has minimum requirements.

Table 2-6 describes the required disk space for each available function. /opt and /home are the only LVM areas that are described as the other areas are used by HP-UX and C-developers only.

Table 2-6. Disk space requirements

Description	Size MB				System Specific
	Total	/opt	/home	/var	
HP-UX including patches and C ANSII developer	593	175	0	100	
AI Basic Functions including SQL*Connect and User API	422	261	148		

Table 2-6. Disk space requirements

Description	**Size MB**				**System Specific**
	Total	**/opt**	**/home**	**/var**	
AI History, Basic	325	25	250(1)	50	
AI History, additional requirement for configuration			see(2)		
AI Reports	63	42	21		
AB Object Type Builder	1	1	see (3)		
AI Object Handling	34	3	31 (3)		
UPS	3	1	2		
AdvaTalk Link to MATLAB	28	3	25		
SQL*Connect Write	39.1	26	13	0.1	
Programmer 2000 - Pro*C	50	50	0		
Dataset	3	0	3		Master
AdvaInform Event Log(4)	45	5	40		Master
AdvaInform Event Log Large	240	5	235		Master
AdvaInform Calculations	31	5	26		Master
AB Central Backup	2	2	0		Master
MasterBatch compatibility	1.4	1.4			Master
AdvaInform SPC	0.1	0.1			MOD 300
AdvaInform PDL	20.1	0.1	20		MOD 300
On-line JFS	0.4				
Netscape Fasttrack Server	40(5)	39.8			
X-terminal server	69	68		1	
HP applications and Diagnostic Tools	475				
ABB-IMS-UPGR-200	0.5	0.5			
Recommended Free Space in addition to selected options(6)		20%	20%	20%	

(1) When you upgrade, the historical data stored on /disk1, /disk2, /disk3 etc. will be restored under /home. Make sure that /home is dimensioned large enough for this. For new installations, you must dimension space in /home for log entries as described below.

(2) For new installations use the following approximations. Numeric Oracle based = 100 bytes/entry, numeric file-based type1 = 24 bytes/entry, numeric file-based type 2 = 4 bytes/entry, SPC = 102 bytes/entry, message = 250 bytes/entry.
For upgrades, refer to the instructions for documenting your current configuration in Section 2.4.5, Prepare for Upgrade.

(3) The database part of Object Handling is installed by either Object Type Builder or Object Handling, whichever is installed first.

(4) Please note that only one of the Event Log "options" can be installed at the same time.

(5) Also allocates 150 KB under /.

(6) It is recommended that you provide free space (20%) in the logical volumes above what is required for the selected options. For example, if the total for the /opt volume is 408 Meg., then you should configure it to be 408 X 1.2 = 488 Meg.

NOTE

- You can only make an upgrade if your disk capacity is at least 2 GB and enough for the options you have.
- 2GB is not enough for all AdvaInform options and if you need a large swap the disk space is very limited if you install any options.

If you need a new disk, place an order for a replacement disk according to the price list and arrange for installation. Replacement of disks must be done by authorized personnel. If no authorized personnel is available, contact your local ABB sales organization to make one of the following arrangements:

- Have an ABB specialist dispatched to upgrade on site.
- Have a local HP service engineer visit your site.

2.4.4 Requirements for Installation

The following equipment, supplies, software and documentation are required:

- a CD-ROM reader
- a CD-ROM distribution including the following CD-disks:
  - HP-UX 10.20
  - HP-UX 10.20 ACE -supports B180L
  - HP OnLine JFS (This CD is only provided when this option is purchased.)
  - A CD-ROM labeled *AdvaInform SW Miscellaneous* which contains: HP-UX Patch Bundle, HP-UX Application programs, HP-UX additional patches, HP-UX Diagnostic programs, and AdvaInform 2.0 patches.
  - A CD-ROM labeled *AdvaInform SW* which contains the AdvaInform Version 2.0 software and the Upgrade Wizard for Version 1.3 to 2.0
- the *Read me before installation, Quick Guide to Installation* and *Installing HP-UX 10.10 and 10.20* manuals from HP.
- this User´s Guide

2.4.5 Prepare for Upgrade

This section is only applicable when you perform an upgrade. If you are performing a straight installation, go directly to Section 2.4.6, How to connect the CD-ROM reader.

Requirements for Upgrade

In addition to the above requirements, for an upgrade you also need a DAT device and empty DAT tapes sufficient to store configuration and application data.

NOTE

Your Advant Station must already be at AdvaInform Basic Functions version 1.3/n before you can upgrade to version 2.0.

Upgrade Sequence for Alarm Handling (MOD 300 Only)

For systems with MOD 300 software, this software release provides a new alarm/event handling capability that required a change to the format for existing alarm/event messages. For this reason, if you are performing an upgrade to this software release on-line, you MUST upgrade the nodes on the Distributed Communications Network (DCN) in a specific sequence.

CAUTION

If the upgrade is not done in this sequence, process alarms may be lost by Multibus-based consoles, Configurator Data Processors (CDPs), and Advant Stations during the upgrade.

The correct node upgrade sequence is as follows:

1. First, upgrade and restart all nodes that can receive Alarm/Event Messages. This means all Multibus-based consoles and Configurator Data Processors (CDPs), and all Advant Stations with AdvaCommand, AdvaBuild, or AdvaInform software.
2. Next, upgrade and restart any Multibus nodes which have both console and CCF functionality. This includes Turbo nodes with High Density I/O or PLC Gateway functionality. This represents a special class of node which can both receive and send Alarm/Event Messages.
3. Last, upgrade ALL nodes that can send Alarm/Event Messages. This means Model A/B, SC, and Advant Controllers. On-line upgrade capability can be used to upgrade Controller software.

For further information, you can contact Technical Services at:

- SupportLine USA: +1-800-HELP 365
- Worldwide: +1-614-224-5888

Licensing Considerations

Verify that you have ordered a license for all software you plan to install, either as an upgrade or as a new license.

Document Your Current Configuration

Document the following aspects of your current configuration:

- Document your printer configurations. They have to be reconfigured after the upgrade.
- Document your time synchronization and daylight saving settings. If you use any settings other than the default, you must re-configure those after upgrade. Refer to Section 3.3.1, Printer Setup and Section 3.6.11, Time Synchronization and Time Setting for details.
- Document the size of your History database. This is used when sizing the /home logical volume as described in Table 2-6 - Disk Space Requirements. To do this:
  - Log in as imsmgr.
  - In a terminal window, enter: **`$HS_HOME/etc/hsDBMaint -dir -l`**

    This presents the disk allocation and usage for TYPE1 and TYPE2 file-based logs.
  - Calculate the total disk space quota for all rows that DO NOT have a subdirectory under HSFF. Refer to the instructions for **`hsDBMaint`** in the *AdvaInform History User's Guide* for details.
- If you have AdvaInform Display, document:
  - Any changes made to environment variables in the following files:

    ```
    /products/components/Display/etc/AIDisplayenvironment
    /products/components/Display/StartDisplay
    ```
  - Any standard demo displays that have been modified.

Move Application Files to Correct Directory

The Upgrade Wizard backs up and restores all files that reside under the directory tree `/products/data/customer/`. The following HP-UX configuration files are moved (if they exist): /etc/hosts and /etc/exports. Application files that reside under user directories or your own directory structures are not moved by the wizard. Make sure all application files that you want to restore on the upgraded machine are moved to `/products/data/customer/` where the upgrade wizard can process them. This includes report output files, and, if you have AdvaInform Display, user displays in `/products/data/standard/Display`.

Store all information from IMS 1.3 on tape

This procedure is facilitated by the update wizard. To run this wizard:

1. Make sure you have a DAT device properly connected. See Section 3.3.6, DAT Set-up and Compression for instructions on how to connect it.
2. Make sure you have a CD- ROM reader connected as described in Section 2.4.6, How to connect the CD-ROM reader.

CAUTION

Shut down the IMS and turn power off before connecting the DAT device and CD-ROM reader. Otherwise, you may have problems such as reboot and disk-crashes.

3. A full backup of IMS should be performed as described in Section 5.7, Backup and Restore. **Do not start the update before you have made a backup.**
4. Remove the SQL*Connect Write Beta release if it is installed.
5. If you have a beta release of Dataset installed (Master only):
    a. Dump all object instances to a text file
    b. Remove the instances with Object Configuration

NOTE

The Dataset object instances must be removed using Object Configuration!

    c. Shut down the IMS and remove the option using rmfn.
6. Make sure that you have moved all your application programs, data files and user object source files to `/products/data/customer/` and that you have taken care of all third party software and data files as well.
7. Log in as root.
8. Load the upgrade wizard from CD.
    a. Insert the CD labeled AdvaInform SW.
    b. Create a directory for the CD-ROM, and mount the CD-ROM device. For example:

```
# mkdir /cdrom
# mount <device file> /cdrom
```

    The device file is /dev/dsk/c201d2s0. You can easily confirm the device file name with the command:

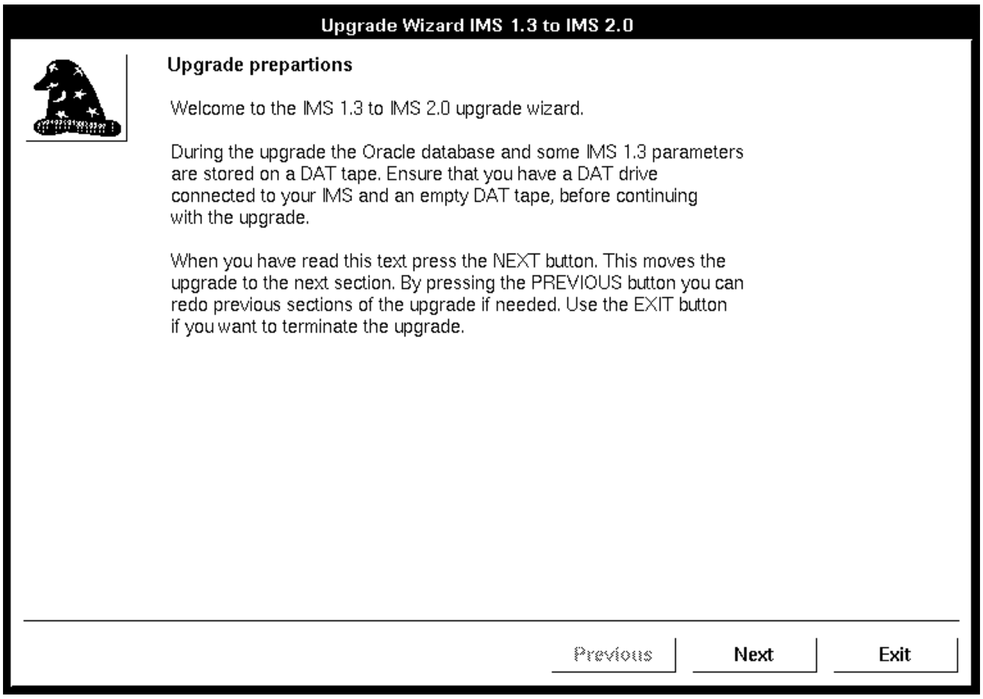
```
# ll /dev/dsk/
```

    c. Enter `# update`
    d. Select **`Change Source or Destination`**
    e. Select **`From Tape Device to Local System`**.
    f. Set the source to:

    /cdrom/IMS-UPGR-130`.updt`

    g. Press **Done**.
    h. Choose **Select/View Partitions and Filesets** from the main menu.
    i. Select **IMS-UPGR-130** and then press **Start Loading**.
9. If the IMS is stopped, re-start it.
10. Start the Upgrade Wizard:

```
# cd /products/components/Upgrade/bin
# ./startwizard13
```



Upgrade prepartions

Welcome to the IMS 1.3 to IMS 2.0 upgrade wizard.

During the upgrade the Oracle database and some IMS 1.3 parameters are stored on a DAT tape. Ensure that you have a DAT drive connected to your IMS and an empty DAT tape, before continuing with the upgrade.

When you have read this text press the NEXT button. This moves the upgrade to the next section. By pressing the PREVIOUS button you can redo previous sections of the upgrade if needed. Use the EXIT button if you want to terminate the upgrade.

Figure 2-4. Wizard - performing RTA backup

The wizard will guide you through the whole procedure and will shut down the IMS system when necessary.

During the output phase the Wizard will prompt you to insert new DAT tapes. It will also provide feedback regarding the upgrade. The Wizard has three buttons, **Previous**, **Next** and **Exit**.

– **Previous** lets you go back to the previous screen to redo an action. Not all actions can be repeated. The **Previous** button should only be used if absolutely necessary.

– **Next** lets you proceed to the next screen to continue the upgrade procedure.

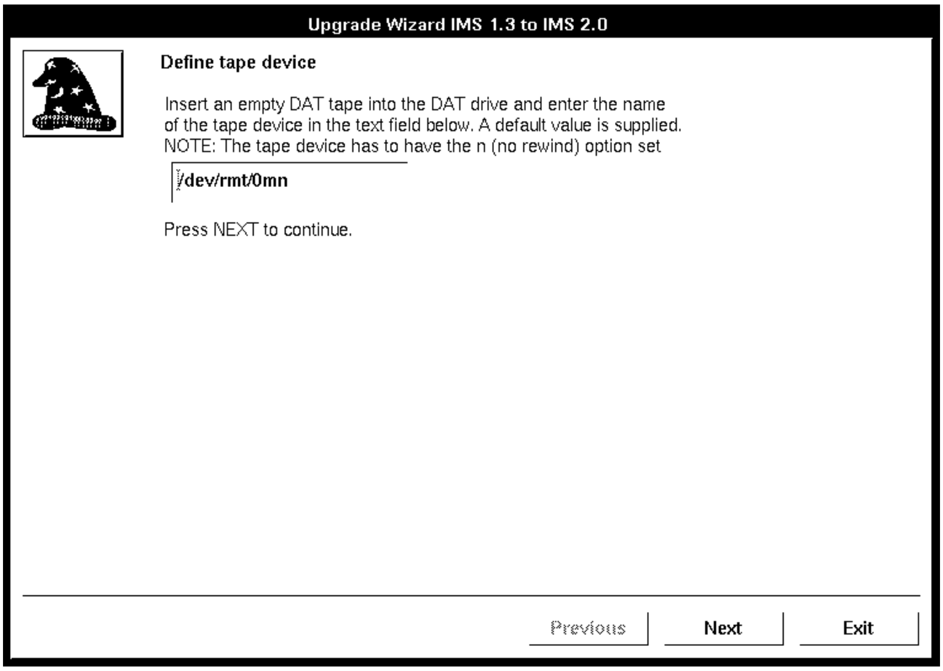
– **Exit** can be used to stop the Wizard if the Upgrade must be stopped.

As the first step (Master only) the RTA information will be backed up. If the AdvaInform software is not started the wizard will prompt you to start it after terminating the wizard. When AdvaInform is running start the upgrade again.

When the RTA backup is finished, the AdvaInform software will be stopped and then the Wizard will request you to enter the name of the tape device, Figure 2-5. In most cases the default is sufficient.

NOTE

If you change the device name, make sure it ends with an *n* (no rewind).



Upgrade Wizard IMS 1.3 to IMS 2.0

Define tape device

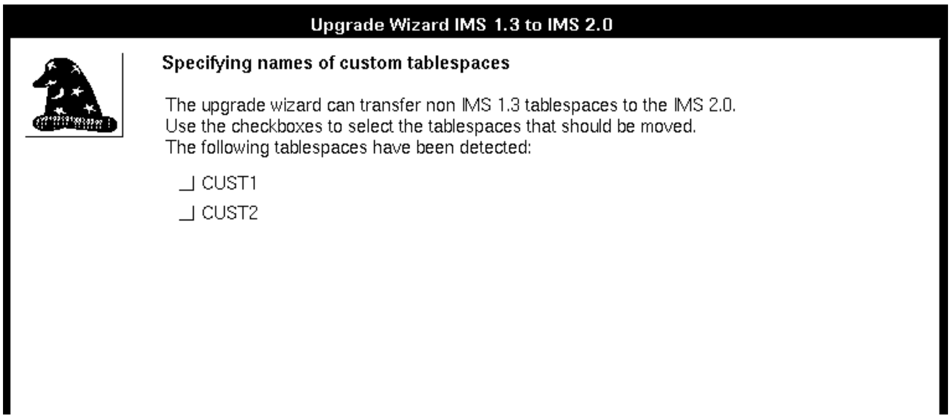
Insert an empty DAT tape into the DAT drive and enter the name of the tape device in the text field below. A default value is supplied. NOTE: The tape device has to have the n (no rewind) option set

/dev/rmt/0mn

Press NEXT to continue.

Figure 2-5. Wizard - Defining the tape device

The Wizard will then prepare to store application files on tape and verify the content of the Oracle database. If you have any non IMS tablespaces, they will be identified and you will be prompted to specify whether or not to include them in the transfer. If they are included, make sure to dimension the `/home/` logical volume accordingly. The dialog will not be displayed unless you have customer table spaces. See Figure 2-6.



Specifying names of custom tablespaces

The upgrade wizard can transfer non IMS 1.3 tablespaces to the IMS 2.0.
Use the checkboxes to select the tablespaces that should be moved.
The following tablespaces have been detected:

☐ CUST1
☐ CUST2

Figure 2-6. Taking care of customer specific tablespaces

When you have marked which ones to include you will get a list of oracle users to be created. The users will be created with basic privileges only. Write the list of users down so you can add privileges to them after the upgrade. Now the Wizard starts to store the data on tape. The number of tapes required depends on the installed options, and the size of your own tablespaces and disk files placed under `/products/data/customer/`. Normally you need one tape for History and one for everything else. The time required to store data on tape is also depends on the size of your installation.

NOTES

- It is very important that you mark the DAT files properly and take good care of them. Write protect the tapes as you remove them from the tape device.
- It is recommended that you check the log files in the /tmp directory after running the upgrade wizard, even if there are no apparent problems.

When you have finished storing the IMS 1.3 configuration and run time data, continue the installation procedure at Section 2.4.6, How to connect the CD-ROM reader.

2.4.6 How to connect the CD-ROM reader

If your CD-ROM reader is removable you must check that the SCSI address of your CD-ROM reader is set to 2. The address is set using the selector on the rear side of the drive. Also check that the CD-ROM reader is connected to the Advant Station SCSI port. It is recommended that you use SCSI address 2 for CD-ROM and SCSI address 3 for DAT.

NOTE

Power to the IMS must be off when you connect the CD-ROM reader.

2.4.7 How to Install HP-UX 10.20 and HP Options

CAUTION

- If you are performing an upgrade, this is your last chance to save any files from the current installation on tape for later restore. Make sure that all files that need to be saved have been moved from user directories and `/tmp` to `/products/data/customer/`
- Make sure the clock and Time Zone are set up properly. It is very important that the Time Zone and the clock are set up identically for all Advant Stations in a network. If not, time synchronization and Daylight saving will fail which will disturb your History logging and trend presentation when Daylight saving occurs.

To install HP-UX 10.20 and HP options:

1. Make sure that you have the IP address (required only if you are installing the IMS on a plant network), the node name and time zone information available before you start your installation. If not, collect that information before you start.
2. Install HP-UX 10.20. For most hardware platforms, use the CD labeled HP-UX 10.20.

   If you are installing the software on an AS530/B180L or B132L+, you have to use the HP-UX 10.20 ACE CD-ROM instead.

   Install the correct CD as described above, and then complete the installation according to these HP manuals: *Read me before installation, Quick Guide to Installation* and *Installing HP-UX 10.10 and 10.20*.

   In this procedure you will:

   – Halt the boot process and boot from the CD-ROM.

   – Select CDE and English as the user interface.

   – Select LVM (Logical Volume Manager) as the file system type.

   – Configure the use of additional SCSI disks as part of the Logical Volume Group.

   – Adjust the size of the logical volumes prior to continuing installation. See Section 2.4.3, Calculate Required Disk Space.

   – Configure swap sizes - See Section 2.4.3, Calculate Required Disk Space.

   For multiple-disk systems, HP recommends that you distribute swap space between two disks. The easiest way to do this is to allocate half the recommended swap space during the installation of HP-UX 10.20 (this step), and then the other half via SAM after all HP patches and applications have been installed (as instructed in step 6 below).

   Remove the CD when you are finished.
3. Create a directory for the CDROM device. Enter:

```
# mkdir /cdrom
```

4. If you did not purchase the HP OnLine JFS option, skip this step and go directly to step 5. If you did purchase this option:
    a. Insert the HP OnLine JFS CD, and mount the CD-ROM device. For example:

    ```
    # /usr/sbin/mount <device file> /cdrom
    ```

    The device file can either be /dev/dsk/c0t2d0 or /dev/dsk/c1t2d0. You can easily check which device file to use with the command:

    ```
    # ll /dev/dsk/
    ```

    b. Install HP OnLine JFS software. Enter:

    ```
    /usr/sbin/swinstall -s /cdrom
    ```

    Mark and install the HP OnLine JFS software: **B5117AA_APZ**. First select the line in the swinstall Graphical Interface window, then choose **Mark for Install** from the **Actions** menu. Marked items have **Yes** in the **Marked?** column. Install the marked items by choosing **Install (Analysis)** from the **Actions** menu.

    c. Remove the HP OnLine JFS CD.

5. Install the applications, extension software, and patches. This software is provided on a CD-ROM labeled AdvaInform SW Miscellaneous.
    a. Insert the CD labeled AdvaInform SW Miscellaneous, and mount the CD-ROM device. For example:

    ```
    # /usr/sbin/mount <device file> /cdrom
    ```

    The device file can either be /dev/dsk/c0t2d0 or /dev/dsk/c1t2d0. You can easily check which device file to use with the command:

    ```
    # ll /dev/dsk/
    ```

    b. Make a dummy file to prevent HP-UX from saving original files. This will preserve disk space in the var logical volume. To do this:

    First, make sure this directory exists: `/var/adm/sw/patch`
    If not, create this directory by entering:
    # **mkdir -p /var/adm/sw/patch/PATCH_NOSAVE**
    Then create the dummy file in this directory by entering:
    # **touch /var/adm/sw/patch/PATCH_NOSAVE**

    You must remove this dummy file when you are finished installing the HP-UX software.

    c. Install the HP-UX patches. Enter:

    ```
    /usr/sbin/swinstall -s /cdrom/HP-extsw
    ```

    Mark and install all software in the HP-extsw depot.

NOTE

If you are installing software on either a B180 or B132L+ machine (using the ACE CD-ROM in step 2), patch PHSS_8982 is superseded by a patch on the ACE CD. Therefore you must unmark this patch before you perform the Install(Analysis) step.

d. Install HP C/ANSI C Developers software and Web support software. First mount the CD as described in step 5a above. Then enter:

```
/usr/sbin/swinstall -s /cdrom/Applications
```

Mark and install the C Developers software: **B3898AA_APZ** and web support software: **J1608CA**. First select those lines in the swinstall Graphical Interface window, then choose **Mark for Install** from the **Actions** menu. Marked items have **Yes** in the **Marked?** column. Install the marked items by choosing **Install (Analysis)** from the **Actions** menu.

e. Install the additional HP patches. Enter:

```
/usr/sbin/swinstall -s /cdrom/HP-addpatches
```

Use the **Match What Target Has** menu item in the **Actions** menu rather than Mark for Install to ensure that you only install patches for installed software, and then install the marked software.

NOTE

If you get a message indicating that there is not enough disk space to install the selected options, you will have to extend the corresponding logical volume. Use the `lvextend` command. An example is shown in Section 2.14, How to Extend a Logical Volume After Installation. Refer to the applicable manpage for further details.

f. Remove the CD.

6. Allocate the second half of the recommended swap space via SAM. This step is NOT required for single-disk systems.

7. Remove dummy file created in step 5b. Enter:

```
# rm -f /var/adm/sw/patch/PATCH_NOSAVE
```

2.4.8 AdvaInform Software Installation

2.4.8.1 Verifications Before AdvaInform Software Installation is Started

Before you install the AdvaInform software you need to verify that the HP-UX installation is correct. First verify the LVM configuration, and then verify the swap size. If you have multiple disks and have distributed the swap space on more than one disk (according to the recommendation in Section 2.4.7, How to Install HP-UX 10.20 and HP Options), you must also verify that the swap space has been distributed as you intended.

LVM Configuration

The bdf command provides a list of all LVM sections and the available space. Compare these with Table 2-5 and Table 2-6.

Verify Swap Space Size

The following procedure describes how to check whether the total swap space you configured meets your requirements. First, enter the swapinfo command as shown below.

```
# swapinfo
```

An example output for this command is shown in Figure 2-7.

```
 Kb      Kb      Kb    PCT   START/      Kb
TYPE      AVAIL    USED    FREE  USED   LIMIT RESERVE  PRI  NAME
dev      204800       0  204800    0%       0       -    1  /dev/vg00/lvol2
dev      131072       0  131072    0%       0       -    1  /dev/vg00/lvol4
```

Add values in this column to determine your configured swap space

Figure 2-7. swapinfo to Check Swap Space Size

Add the values in the AVAIL column, and then compare that sum to the value in the SWAP column in Table 2-5 that fits your configuration.

Verify Distribution of Swap Space

NOTE

Skip this procedure if your IMS only has one disk.

When you intend distribute the swap space on more than one physical device (as is recommended in Section 2.4.7, How to Install HP-UX 10.20 and HP Options), you need to verify that this actually occurs. Even when you use the recommended procedure, there is no guarantee that these will be placed on different physical devices.

The following procedure describes how to check, whether or not the swap sizes are placed on separate physical devices, and what steps to take if they are not:

1. Determine which Logical Volumes are being used for swap. Enter:

   ```
   # swapinfo
   ```

   An example output for this command is shown in Figure 2-8.

```
 Kb      Kb      Kb   PCT  START/      Kb
TYPE      AVAIL    USED    FREE  USED   LIMIT RESERVE  PRI  NAME
dev      204800       0  204800    0%       0       -    1  /dev/vg00/lvol2
dev      131072       0  131072    0%       0       -    1  /dev/vg00/lvol4
```

Indicates two logical volumes

Figure 2-8. swapinfo to Determine Swap Space Distribution

2. Determine which Physical Devices are being used for each swap Logical Volume. Use the `lvdisplay` command for each logical volume, Figure 2-9 and Figure 2-10.

   Compare the PV Names (PV stands for physical volume).

   - If they are different, it indicates that the swap space logical volumes have been placed on different physical device. In this case, you are finished with this procedure. Continue with the procedure to verify Language, CDE, Clock, and Time Zone following this section.
   - If they are the same, it indicates that the swap sizes have NOT been placed on different physical devices, and you must proceed with step 3.

   In the example shown in Figure 2-9 and Figure 2-10, the PV name for lvol2 and lvol4 are the same (c0t6d0). Therefore, the swap space logical volumes are on the same physical device, and must be placed on separate ones as described in the remainder of this procedure.

```
# lvdisplay -v /dev/vg00/lvol2
--- Logical volumes ---
LV Name                     /dev/vg00/lvol2
VG Name                     /dev/vg00
LV Permission               read/write
LV Status                   available/syncd
                        .
                        .
                        .
Allocation                  strict/contiguous
   --- Distribution of logical volume ---
   PV Name            LE on PV  PE on PV
   /dev/dsk/c0t6d0    50        50
   --- Logical extents ---
   LE   PV1                PE1  Status 1
   0000 /dev/dsk/c0t6d0    0012 current
   0001 /dev/dsk/c0t6d0    0013 current
   0002 /dev/dsk/c0t6d0    0014 current
   0003 /dev/dsk/c0t6d0    0015 current
   0004 /dev/dsk/c0t6d0    0016 current
   0005 /dev/dsk/c0t6d0    0017 current
   0006 /dev/dsk/c0t6d0    0018 current
   0007 /dev/dsk/c0t6d0    0019 current
                          .
                          .
                          .
   0048 /dev/dsk/c0t6d0    0060 current
   0049 /dev/dsk/c0t6d0    0061 current
```

command for lvol2

PV name for lvol2

Figure 2-9. lvdisplay output for logical volume 2

```
# lvdisplay -v /dev/vg00/lvol4
--- Logical volumes ---    PE1  Status 1
LV Name                     /dev/vg00/lvol4
VG Name                     /dev/vg00nt
LV Permission               read/write
LV Status                   available/syncd
                        .
                        .
                        .
Allocation                  strict/contiguous
   0014 /dev/dsk/c0t6d0    0026 current
   --- Distribution of logical volume ---
   PV Name            LE on PV  PE on PV
   /dev/dsk/c0t6d0    32        32
   0018 /dev/dsk/c0t6d0    0030 current
   --- Logical extents --- 0031 current
   LE   PV1                PE1  Status 1
   0000 /dev/dsk/c0t6d0    0083 current
   0001 /dev/dsk/c0t6d0    0084 current
   0002 /dev/dsk/c0t6d0    0085 current
   0003 /dev/dsk/c0t6d0    0086 current
   0004 /dev/dsk/c0t6d0    0087 current
   0005 /dev/dsk/c0t6d0    0088 current
   0026 /dev/dsk/c0t6d0    0109 current
                          .
                          .
                          .
   0027 /dev/dsk/c0t6d0    0110 current
   0028 /dev/dsk/c0t6d0    0111 current
   0029 /dev/dsk/c0t6d0    0112 current
```

command for lvol4

PV name for lvol4

Figure 2-10. lvdisplay output for logical volume 4

3. Determine which Physical Volume has enough free space to hold the smaller of the swap spaces listed in step 2. Enter:

   ```
   # pvdisplay /dev/dsk/c*
   ```

   This procedure assumes that you did not allocate all of your Volume Group Space to Logical Volumes during the installation.

   Based on the output, Figure 2-11, choose a Physical Volume other than the one your swap is currently on that has enough Free PE to hold the swap space.

```
# pvdisplay /dev/dsk/c*
--- Physical volumes ---
PV Name                     /dev/dsk/c0t5d0
VG Name                     /dev/vg00
PV Status                   available
Allocatable                 yes
VGDA                        2
Cur LV                      9
PE Size (Mbytes)            4
Total PE                    1023
Free PE                     163
Allocated PE                860
Stale PE                    0
IO Timeout                  default
#
```

Figure 2-11. Output of pvdisplay command

In Figure 2-11, the Free PE on c0t5d0 is 163, which is more than large enough to hold the swap size of lvol4 (32, as indicated in Figure 2-10).

4. Move the Swap Space to the Physical Volume determined in step 3. In the `pvmove` command, Figure 2-12, lvol4 is the smaller of the swap Logical Volumes in step 2, /dev/dsk/c0t6d0 is the device to move from, /dev/dsk/c0t5d0 is the device to move to (from step 3).

```
# pvmove -n /dev/vg00/lvol4 /dev/dsk/c0t6d0 /dev/dsk/c0t5d0
Transferring logical extents of logical volume "/dev/vg00/lvol4"...
Physical volume "/dev/dsk/c0t6d0" has been successfully moved.
Volume Group configuration for /dev/vg00 has been saved in
/etc/lvmconf/vg00.conf
```

Figure 2-12. pvmove Command

5. Confirm the swap space has been moved, Figure 2-13

```
# lvdisplay -v /dev/vg00/lvol4
--- Logical volumes ---
LV Name                     /dev/vg00/lvol4
VG Name                     /dev/vg00
LV Permission               read/write
LV Status                   available/syncd

                        .
                        .
                        .
Allocation                  strict/contiguous
   --- Distribution of logical volume ---
   PV Name            LE on PV  PE on PV
   /dev/dsk/c0t5d0    32        32
   --- Logical extents ---
   LE   PV1                PE1  Status 1
   0000 /dev/dsk/c0t5d0    0000 current
   0001 /dev/dsk/c0t5d0    0001 current
   0002 /dev/dsk/c0t5d0    0002 current
                        .
                        .
                        .
   0029 /dev/dsk/c0t5d0    0029 current
   0030 /dev/dsk/c0t5d0    0030 current
   0031 /dev/dsk/c0t5d0    0031 current
```

Figure 2-13. Verifying that swap space has been moved

Verify Language, CDE, Clock and Timezone

Verify that the selected language option is English, and that the User Interface is CDE. You see CDE as soon as you try to log in. The log-in procedure is clearly marked as CDE. Once logged in, all the messages, help (man) and other information should be in the english language.

Check the clock and the time zone. The following command gives you the current date and time and the time zone, for example, Middle European Time Daylight Saving Time (METDST):

```
# date
```

```
Wed Jul  2 12:52:49 METDST 1997
```

If the clock or time zone configurations need to be changed, refer to Section 3.6.11, Time Synchronization and Time Setting.

CAUTION

> The Advant Station programs are protected by copyright law and international treaties. Before you install any of the options on your station, you must verify that you have acquired the right to use that particular option on your station and have received the Software Certificate authorizing such use.

NOTE

> If you are upgrading your Advant Station hardware in addition to the software, and you need to move the application data from your existing Advant Station on to a new Advant Station, you should maintain the IP address and host name from the upgraded machine. That information is copied as part of the import of data when you restore the application data on to the new Advant Station; however, you should have already entered that information properly when you installed the software. Make sure that the old Advant Station is not started up after this procedure, since there will be a conflict of IP addresses between the two Advant Stations.

2.4.8.2 How AdvaInform Software is Packaged on CD-ROM

The AdvaInform software is provided on a CD labeled AdvaInform SW. The products on this CD are listed in Table 2-7.

Table 2-7. AdvaInform Partitions

Products	Description	Specific
IMS-UPGR-130.updt	Upgrade wizard used to store configuration from IMS 1.3	
ABB-AI-BF-MASTER	AdvaInform Basic Functions including Advant OCS communication Master	Master
ABB-AI-BF-MOD	AdvaInform Basic Functions including Advant OCS communication MOD 300	MOD 300
ABB-AI-BF-SALONE	AdvaInform Basic Functions Stand Alone	
	AdvaInform User API (included in AdvaInform Basic Functions bundle)	
	*AdvaInform SQL*Connect (included in AdvaInform Basic Functions bundle)*	
ABB-AB-OBJBUILD	AdvaBuild Object Type Builder	
ABB-AI-OBJHANDL	AdvaInform Object Handling	
ABB-AI-HISTORY	AdvaInform History	
ABB-AI-REPORTS	AdvaInform Reports	
ABB-AI-CALC	AdvaInform Calculations	Master
ABB-AI-UPS	AdvaInform UPS	
ABB-AI-EVLOG-REG	AdvaInform Event Log Regular	Master
ABB-AI-EVLOG-LRG	AdvaInform Event Log Large	Master
ABB-AT-LT-MATLAB	AdvaTalk Link to MATLAB	
ABB-AI-SPC	AdvaInform SPC	MOD 300
ABB-AI-PDL	AdvaInform PDL	MOD 300
ABB-AI-SQLWRITE	AdvaInform SQL*Connect Programming	
ABB-DATASET	Dataset	Master
ABB-AB-PRO-C	Programmer 2000 - Pro*C	
ABB-AI-MB-COMP	MasterBatch Communication software	Master
ABB-AB-CEN-BACK	AdvaBuild Central Backup	Master
ABB-IMS-UPGR-200	Upgrade wizard to restore configuration to IMS 2.0	

2.4.8.3 Installation Overview

The installation procedure has two parts. The first part is the actual execution of the install function, swinstall. This includes the selection of the options to be installed. The second part is the selection of workstation mode, and configuration of control network parameters.

Before you begin the installation procedure, check the following:

- Make sure that you know the IMS address. That is the node address in the control network.
- Connect the CD-ROM reader according to Section 2.4.6, How to connect the CD-ROM reader.
- Verify that the LAN connector for TCP/IP is either connected to the network or terminated.
- Verify that the sizes of the Logical Volumes are correct and that enough space is left for the options you plan to install. See Section 2.4.3, Calculate Required Disk Space, Table 2-6.

NOTE

If you are perfoming an upgrade, when you are finished installing the AdvaInform software, the imsmgr user has been replaced with ocsmgr, and the imsegr and imsopr users have been removed.

2.4.8.4 Installation with swinstall

This describes how to install IMS 2.0 for HP-UX 10.20. As prerequisites, HP-UX 10.20 must be installed correctly according to Section 2.4.7, How to Install HP-UX 10.20 and HP Options, and a CD-ROM reader must be connected to the workstation.

1. Log on as root-user.
2. Insert the CD labeled AdvaInform SW, and mount the CD-ROM device. See the example below:

   ```
   # mount <device file> /cdrom
   ```

   The device file can either be /dev/dsk/c0t2d0 or /dev/dsk/c1t2d0. You can easily check which device file to use with the command:

   ```
   # ll /dev/dsk/
   ```

NOTE

The /cdrom directory was already created when you installed the HP-UX 10.20 software as described in Section 2.4.7, How to Install HP-UX 10.20 and HP Options.

3. Enter **swinstall** to start the installation program with the command:

   ```
   # swinstall -s /cdrom
   ```

4. Mark and install the software unit for the AdvaInform Basic Functions.
   a. Select the options you are licensed to use, according to the list in Table 2-7.

      Select ABB-IMS-UPGR-200 if you are performing an upgrade, and will need to run the upgrade wizard to restore you application files.
   b. Choose **Mark for Install** from the **Actions** menu. Marked items are indicated by **Yes** in the **Marked?** column.
   c. When you have marked all the desired software units choose **Install(Analysis)** from the **Actions** menu.

NOTE

If you get a message indicating that there is not enough disk space to install the selected options, you will have to extend the corresponding logical volume. Use the **`lvextend`** command. An example is shown in Section 2.14, How to Extend a Logical Volume After Installation. Refer to the applicable manpage for further details.

5. Check the log file /var/adm/sw/swagent.log for information about the analysis phase. If the analysis detects errors, perform the necessary actions to fix the errors, then start over with step 4. If the analysis phase does not detect any errors, continue the installation with step 6.
6. Press the **OK** button in the Install window. This executes the installation which takes from 40 to 80 minutes depending on how many options you chose to install. When installation is finished, the system will reboot.

After reboot the IMS has to be configured as described in Section 2.4.9, Post Installation Procedures.

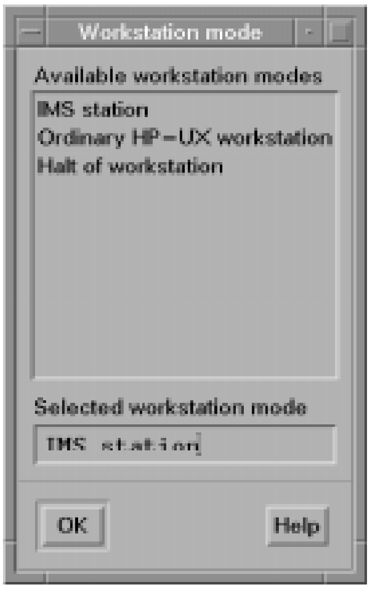
2.4.9 Post Installation Procedures

This involves:

- selecting the workstation mode
- configuring the control network parameters
- installing patches and revisions
- dimensioning primary memory usage

2.4.9.1 Selecting Workstation Mode

When you begin the start-up procedure, the Workstation Mode dialog box is displayed, Figure 2-14. Use this dialog box to select the workstation mode.



Selected workstation mode: IMS station

Figure 2-14. Workstation Mode dialog box

The default mode is **IMS Station**. The other modes are **Ordinary HP-UX workstation** and **Halt of workstation**. Ordinary HP-UX workstation boots the workstation without starting any AdvaInform software. Halt of workstation shuts down the workstation so power can be switched off.

If you do not make a selection in this dialog box within 10 seconds, the default is accepted, the dialog box is removed, and the start-up procedure continues.

2.4.9.2 Configuring the Control Network

The Control network configuration dialog box is displayed. This dialog box has a different version for Master, Figure 2-15, and MOD 300, Figure 2-16.

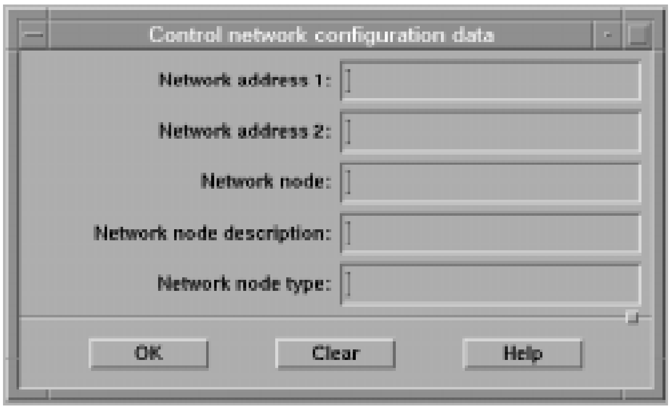


Figure 2-15. Control network configuration dialog box for MASTER

The Master dialog box has the following fields:

Network Address 1	Defines the first of the two available network addresses. The first one must always be defined. In the case of redundant networks Network Address 1 is used by default.
Network Address 2	Defines the second of the two available network addresses. The second address has to be defined in the case of redundant networks.
Network node	Specifies the node address. The node address is the same, even if redundant networks are used.
Network node description	This is a description that is displayed on the IMS menu. This description MUST be entered.
Network node type	The only valid choice for IMS nodes is IMS.

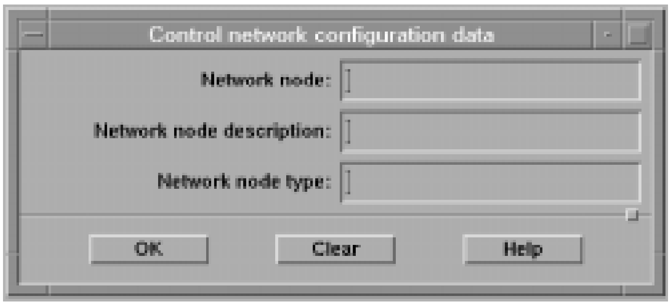


Figure 2-16. Control network configuration dialog box for MOD 300

The MOD 300 dialog box has the following fields:

Network node	This is the control network (DCN) address for the IMS node (in decimal).
Network node description	This is a description that is displayed on the IMS menu. This description MUST be entered.
Network node type	The only valid choice for IMS nodes is IMS.

Enter the required information, and then click on **OK** button.

Log on as root and check the log file **/var/adm/sw/swagent.log**. There should be no error messages related to the installation of the IMS software or the reboot of the system.

NOTES

- To access Nodes via MasterGates you must do a configuration according to Section 3.6.1, How to Configure Control Network Parameters.
- This note only applies to Master applications. If you make a new installation of an IMS that replaces a previous installation, make sure to retranslate all object references to the previous installation from other Advant nodes. Use the Object Reference Maintenance tool to find all references to that IMS node and retranslate them.
- If you are making a **Stand Alone** installation, the network and node fields are not editable and they should be left blank.

2.4.9.3 Check Log File

It is recommended that you check the log file for errors at this point. In addition you must remove the CD. To do this:

1. Check the log file for errors: /var/adm/sw/swagent.log
2. Remove the CD.

2.4.9.4 Install Patches and Revisions

Install the AdvaInform patches. This software is provided on a CD-ROM labeled AdvaInform SW Miscellaneous. This step is only required when patches and/or revisions are provided on the CD.

> You must stop AdvaInform processes as described in Section 2.3.1, How to Stop AdvaInform Processes BEFORE you can install the AdvaInform patches. DO NOT use the `-oracle` option when you enter the `IMSstop` command. Oracle must be left running.

To install the AdvaInform Patches:

1. Insert the CD labeled AdvaInform SW Miscellaneous and mount the CD-ROM device.
2. Enter: **`swinstall -s /cdrom/ABB-patches/patches`**
3. Mark and install the patches. Use the **Match What Target Has** menu item to ensure that you only install patches for AdvaInform software that you have installed.
4. Change source to **`/cdrom/ABB-patches/revisions`**
5. Mark and install the patches. Use the **Match What Target Has** menu item to ensure that you only install patches for AdvaInform software that you have installed.
6. Enter: **`exit swinstall`**
7. Unmount the CD-ROM device and remove the CD.

2.4.9.5 Updating the OMF config.cfg File

The default memory allotment for OMF shared memory is 3 MB. If the calculations you performed in Section 2.4.2.1, Memory Extensions For User Objects and History indicate that more memory is required, you must update the `OMF config.cfg` file located in `/etc/opt/advant/OMF`.

To do this:

1. Change the access rights for the configuration file:
   `chmod 644 /etc/opt/advant/OMF/config.cfg`
2. Modify the content of the configuration file `config.cfg`

   The parameters are defined with the following syntax:

   ```
   parameter name = value
   ```

   The parameters are grouped in different sections. A new section is started with:

   ```
   [section name]
   ```

   Under the section [SharedMemory] change the memory size. The size must be a multiple of 256:

   ```
   # Size is in Kbytes
   Size              = 3072   --> New value
   ```
3. Restore the access rights for the configuration file:
   `chmod 444 /etc/opt/advant/OMF/config.cfg`
4. Restart the IMS.

2.4.9.6 Configuring UPS

When you install the AdvaInform 2.0 software, the UPS_TYPE environment variable is set to the new UPS type: PWA30. If you have the old UPS types SV520 and SV521 respectively you must edit the file /opt/advant/UPS/etc/environment to re-assign the value FISKARS (instead of PWA30) to the environment variable UPS_TYPE. FISKARS corresponds to the old types of UPS. The content of /opt/advant/UPS/etc/environment is shown in Figure 2-14.

Edit/change this row →

```
#Set up UPS variables
export UPS_TYPE=PWA30
...
```

Figure 2-17. Editing UPS_TYPE Environment Variable

After doing this change, the AdvaInform node must be restarted.

2.4.10 Post-Upgrade Work

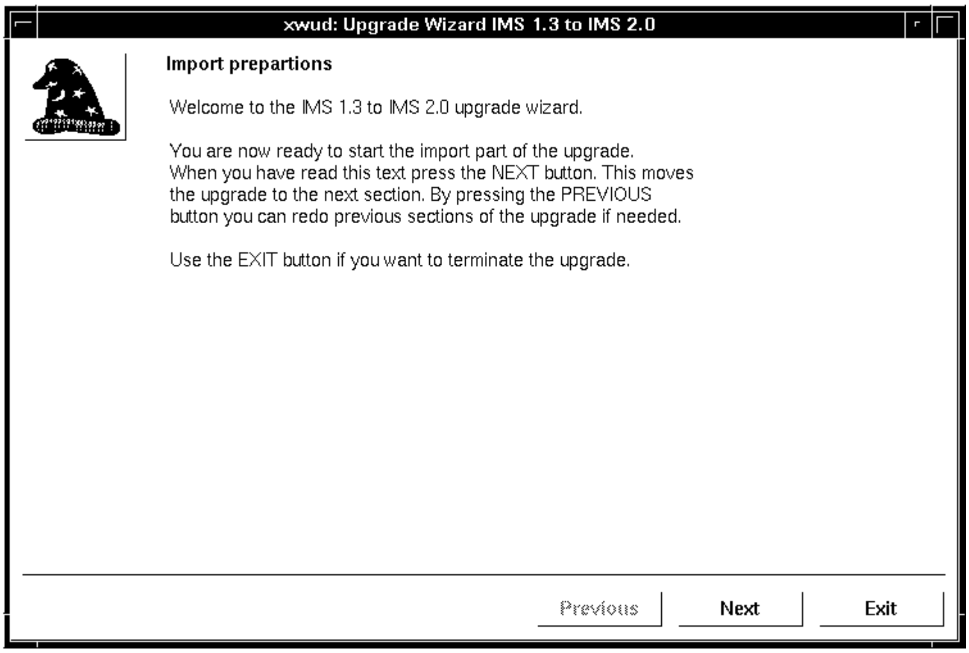
This section is only applicable when you perform an upgrade. If you are performing a new installation, skip this section.

2.4.10.1 Restore Application Data

This procedure is facilitated by the upgrade wizard. To restore your application data using the upgrade wizard:

1. Log in as root.
2. Install the AdvaInform 2.0 upgrade software from the CD-ROM labeled AdvaInform SW using swinstall (if you did not install it already in Section 2.4.8.4, Installation with swinstall). The name of the product is ABB-IMS-UPGR-200
3. Start the upgrade wizard which will guide you through the import of the configuration and run time data exported from your IMS 1.3. The IMS is automatically stopped during the import.

```
# cd /opt/advant/Upgrade/bin/
# ./startwizard20
```



xwud: Upgrade Wizard IMS 1.3 to IMS 2.0

Import prepartions

Welcome to the IMS 1.3 to IMS 2.0 upgrade wizard.

You are now ready to start the import part of the upgrade.
When you have read this text press the NEXT button. This moves
the upgrade to the next section. By pressing the PREVIOUS
button you can redo previous sections of the upgrade if needed.

Use the EXIT button if you want to terminate the upgrade.

Figure 2-18. Import preparations

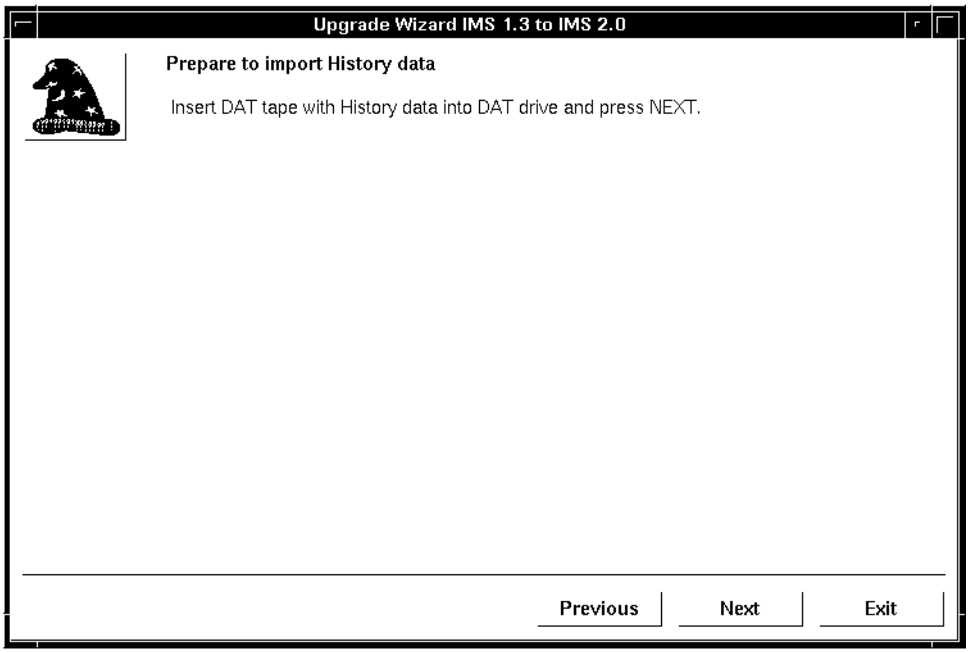
The Wizard will now help you to import the data.

a. Define the device name of your tape device. Normally you can use the default name. If you use another name, make sure it is a no rewind device (use the *n* option).

b. Insert the first tape when prompted to do so. The import will start automatically.

c. If there was more than one tape in the first export phase, you are prompted to insert tape 2. Remove the first tape, and then insert the second tape if necessary.

d. If History is installed, when all the data from the first export phase is imported, you are prompted to insert the next History tape, Figure 2-19. Insert the History tape if prompted to do so.



Prepare to import History data

Insert DAT tape with History data into DAT drive and press NEXT.

Figure 2-19. preparing import of History data

e. When History data is installed the wizard will prompt you to do some additional actions such as:

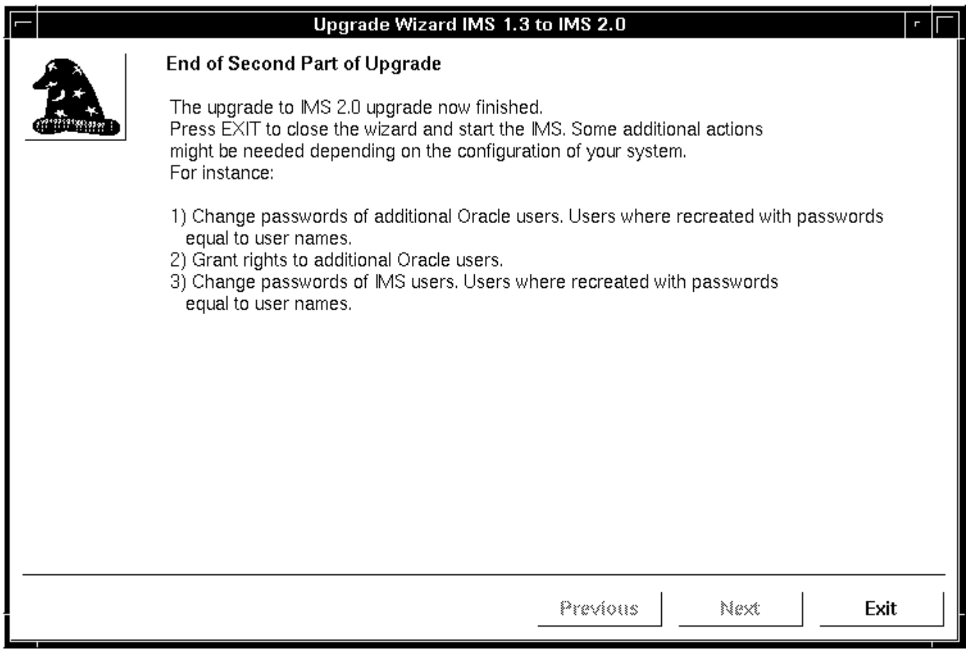
If there were customer specific Oracle users:

- Change the password of the Oracle user´s that own your customer specific table spaces.

- Grant rights to those Oracle users

Change the password of the IMS users. All IMS users on the IMS 1.3 are recreated with an initial password equal to the user name.

f. Exit the wizard when you have completed all actions.



End of Second Part of Upgrade

The upgrade to IMS 2.0 upgrade now finished.
Press EXIT to close the wizard and start the IMS. Some additional actions
might be needed depending on the configuration of your system.
For instance:

1) Change passwords of additional Oracle users. Users where recreated with passwords
   equal to user names.
2) Grant rights to additional Oracle users.
3) Change passwords of IMS users. Users where recreated with passwords
   equal to user names.

Figure 2-20. End of Upgrade Screen

NOTE

It is recommended that after the software is upgraded, you should start the station and verify that the AdvaInform software operates correctly. Once you have verified correct operation, make a full station backup.

2.4.10.2 Post-Upgrade Procedures for AdvaInform Reports

The system must be started in order to perform the following post upgrade work.

For Reports that Include Oracle Graphics

If you have included Oracle graphics (.ogd files) in any of your reports you will have to make manual corrections to these reports. To do this:

1. Check the file `/var/opt/advant/tmp/ReportsUpgradeNotes.txt`.

   This file contains a list of all occurrences of Oracle graphics that exist in the standard report templates directory. If the file does not exist, then no such graphics exist. Skip the rest of this procedure, and go directly to the next procedure.

NOTE

If a report contains a graphic that was not stored in the standard directory it will not be listed in the `ReportsUpgradeNotes.txt` file.

2. Run `/opt/advant/Reports/bin/exergsqlrep`.
3. For each report that requires modification:
    a. Open the report.
    b. Use the Layout Editor to select each Oracle graphic.
    c. Change the file path to `/home/opt/advant/Reports/customer/templates`

For Reports that Use the File Output Parameter

For each configured report that contains a file output parameter, if the default path was used prior to the upgrade, the report output file directory path will automatically be changed to `/home/opt/advant/Reports/customer/reports`.

Read the `ReportsUpgradeNotes.txt` file to find a list of reports that do not use the default path. The directory path is not automatically changed for these reports and you must manually edit the report output file directory using the Report Configuration tool.

2.4.10.3 Post-Upgrade for AdvaInform History (MOD 300 only)

You must add a Recorder database object in the Advant OCS database under the following conditions:

- If you need to route messages to History for message logging. This is a new database requirement. The Recorder object was not required to support message routing prior to AdvaInform History version 2.2.
- If you need to view data from AdvaInform History on a Multibus-based trend display.

Refer to Section 3.2.2, Database Objects for History for details.

2.4.10.4 Post-Upgrade for AdvaBuild Object Type Builder

If you have AdvaBuild Object Type Builder installed and have built your own object types and created your own instances:

- Re-create your own object types and re-build the object handlers using the files you stored under /products/data/customer/. They are now placed under /home/opt/advant/customer/.

  Create the instances again using the ObjectUtil popIT command and the instance dump files placed under /home/opt/advant/UserObjects/customer/*.db

  ```
  $ ObjectUtil popIT /home/../customer/ObjectTypeName.db
  ```
- Generate a new Type Directory and replace the old one according to the instructions in Section 2.8, How to generate a new Type Directory. This takes approximately one hour.
- Restart IMS and start the object handlers using ObjectHandlers from the ObjectHandlers or Object Type Builder terminal window.
- Object handlers and object types transferred from an IMS with AdvaBuild Object Type Builder cannot be used. They must be recreated within AdvaInform 2.0 and then transferred.

2.4.10.5 Post-Upgrade Procedures for AdvaInform Event Log

If you have the Event Log option installed you must start the Event Logs that you want to be started. All Event Logs were stopped before the export. Use the Event Log Configuration window to start the event logs.

2.4.10.6 Post-upgrade for AdvaInform User API

User API examples and applications:

- If you want to have convenient access to the User API examples you have to build them. They are only provided as source files, not as executables.
- Before any User API applications can be executed, they must be compiled and linked. If they have any hardcoded file paths such must be converted to the new file standard. See Appendix A, Log in to the Initial System Loader (ISL) for a detailed description of how the different directories shall be used.
- Some of the NLS constants in UserAPI/include/*.h have been renamed to be NT compatible. If your User API applications uses those constant you may have to replace them with the new ones.

2.4.10.7 Post-upgrade of clock-synchronization

Clock Synchronization configuration on RTA is not handled in the upgrade. Therefore you must reconfigure your Clock Synchronization according to Section 3.6.11, Time Synchronization and Time Setting.

2.4.10.8 Post-upgrade work for Process Supervision

If you had the start-up and supervision of your own applications defined in IMS 1.3 you must enter the Process supervision display and modify the path to the application and then set the Implemented and Supervision check boxes.

2.4.10.9 Post-upgrade work with files tnsnames.ora and listener.ora

Changes in /etc/tnsnames.ora and /etc/listener.ora are not handled in upgrade. Those changes must be redone after upgrade. The original files from IMS 1.3 are saved as /etc/tnsnames.ora.1p3 and /etc/listener.ora.1p3.

2.5 How to Install Software Options or Patches

This section describes how to install software options that are purchased after delivery, or patches. Generally, software options are installed at the factory along with the AdvaInform Basic Software. If additional software options are purchased later, you may have to install them yourself. Software releases are delivered as partitions or file sets on a CD. Options are installed using the HP-UX swinstall command.

NOTES

- Refer to Section 2.4.2, Calculate Required Primary Memory for information regarding additional memory requirements for AdvaInform software options.
- Make sure that you have the version of the AdvaInform Basic Functions corresponding to the version of the software option to be installed.

The procedure to install software options or patches after delivery is essentially the same as for initial installation as described in Section 2.4.8, AdvaInform Software Installation. The only difference is the software unit that you mark for installation. For instance, if you need to install the AdvaInform Object Handling option, mark ABB-AI-OBJHANDL. If you need to install Patch HIS_210001, then mark that patch. When you have completed the procedure as described in Section 2.4.8, AdvaInform Software Installation, exit and restart.

NOTE

You are not required to configure the IMS after reboot, unless you re-installed the AdvaInform Basic functions.

2.5.1 Upgrade from Stand Alone to Networked AdvaInform Basic Functions

This section describes the installation procedure for AdvaInform Basic Functions when AdvaInform Basic Functions Stand Alone is installed.

1. Stop the IMS by executing the command below as root-user from a terminal window.

   ```
   #/opt/advant/Startup/bin/IMSstop
   ```

2. Install fileset ABB-AI-BF-MASTER or ABB-AI-BF-MOD depending on your OCS software requirements according to Section 2.4.8, AdvaInform Software Installation. When the installation is finished the system will reboot.

3. When the Installation of fileset ABB-AI-BF-MASTER or ABB-AI-BF-MOD is complete stop the IMS by executing the command below.

   ```
   #/opt/advant/Startup/bin/IMSstop
   ```

4. Install the ALONE_TO_NETWORK software package from the ABB-IMS-MISC fileset with **swinstall**. When the installation is finished the system will reboot. During reboot the user will be prompt for the network address see Section 2.4.9.2, Configuring the Control Network. After reboot the IMS will be automatically restarted.

NOTE

If any additional options should be installed it should be done after step 4.

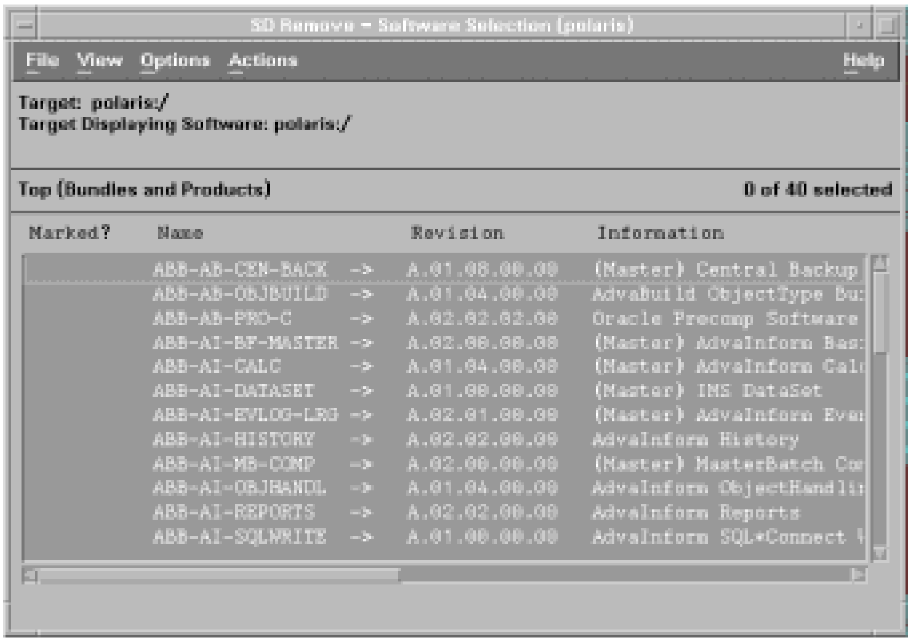
2.6 How to Remove Software Options

This section describes how to remove software options. Generally options are removed using the HP-UX swremove command. An example is provided below.

Example: Remove the AdvaInform History Option

1. Log in as root user.
2. Terminate all AdvaInform processes using the following script
   (See Section 2.3.1, How to Stop AdvaInform Processes for details):

   `/opt/advant/Startup/bin/IMSstop -oracle`
3. Enter **swremove**. This displays the swremove graphical interface. This window shows a list of installed products.



Target: polaris:/
Target Displaying Software: polaris:/

Top (Bundles and Products) 0 of 40 selected

```
Marked?   Name                 Revision          Information
          ABB-AB-CEN-BACK  ->  A.01.08.00.00     (Master) Central Backup
          ABB-AB-OBJBUILD  ->  A.01.04.00.00     AdvaBuild ObjectType Bu:
          ABB-AB-PRO-C     ->  A.02.02.02.00     Oracle Precomp Software
          ABB-AI-BF-MASTER ->  A.02.00.00.00     (Master) AdvaInform Bas:
          ABB-AI-CALC      ->  A.01.04.00.00     (Master) AdvaInform Calc
          ABB-AI-DATASET   ->  A.01.00.00.00     (Master) IMS DataSet
          ABB-AI-EVLOG-LRG ->  A.02.01.00.00     (Master) AdvaInform Eve:
          ABB-AI-HISTORY   ->  A.02.02.00.00     AdvaInform History
          ABB-AI-MB-COMP   ->  A.02.00.00.00     (Master) MasterBatch Com
          ABB-AI-OBJHANDL  ->  A.01.04.00.00     AdvaInform ObjectHandli:
          ABB-AI-REPORTS   ->  A.02.02.00.00     AdvaInform Reports
          ABB-AI-SQLWRITE  ->  A.01.00.00.00     AdvaInform SQL*Connect V
```

Figure 2-21. swremove Graphical Interface

4. Move downwards using the scrollbar to the product you want to remove and select it. Then select Actions-Remove (Analysis).
5. Check the file /var/adm/sw/swagent.log that the removal was successful.
6. Re-start IMS using the script below or reboot station
   (See Section 2.10, How to Re-start AdvaInform Software Manually for details)

   `# /opt/advant/Startup/bin/IMSstart`

2.7 Configuring TCP/IP (Internet) Addresses

If the TCP/IP addresses and node names for your system are available during factory installation of software, the IMS is delivered with that configuration. At factory installation, the default TCP/IP node name is **as1** for the Advant Station 500 Series IMS node.

All available TCP/IP addresses allowed for Advant Station series nodes are included in the /etc/hosts file. If the IMS is to be connected to the international Internet network, unique Internet addresses are available from ARPA.

The TCP/IP node name of the IMS determines the TCP/IP address. To change the IMS node name and the IMS TCP/IP address use the /etc/set_parms command.

```
# /etc/set_parms hostname
```

```
# /etc/set_parms ip_address
```

When node name and TCP/IP are changed on the IMS use the **Maintenance** from the **Settings** menu to connect the node name and TCP/IP address. Changes made under **Networking and Communication** > **Internet Addresses** will affect the file /etc/hosts.

CAUTION

The assigned node name should not be changed. If you still have to do this, you must remove and then install the ABB-AI-SQLCONN fileset again.

You should add internet addresses for other nodes on the TCP/IP network that must be known to the IMS by using the **Maintenance** tool.

2.8 How to generate a new Type Directory

The type directory holds information on all object types known by the Advant OCS. When you define new object types via either the AdvaBuild Object Type Builder or the AdvaInform SQL*Connect Server, you need to update the applicable object type directories to make the new object types accessible.

This procedure requires access at the ocsmgr user level. When adding a new object type via the AdvaInform SQL*Connect Server, update the Object Type Directory as follows:

1. Open a terminal window.
2. Source the IMS environment file. Note the blank character after the dot (". ").

   ```
   $ . /opt/advant/IMS/etc/IMSenvironment
   ```

3. Change working directory to TypeDir/bin

   ```
   $ cd ../TypeDir/bin
   ```

4. Execute the tdgen script

   ```
   $ ./tdgen typedir/typedir
   ```

   This takes approximately 1 hour. The script creates a new shared library that becomes the new Object Type directory.

5. Open a second terminal window

6. Log in as root from the second terminal window and stop IMS.
7. Save the old shared library. Rename the new shared library from the first terminal window to the name of the shared library being used.

```
$ cd ../lib
$ mv libtdTypeDirData.sl libtdTypeDirData.sl.old
$ mv libtdTypeDirData.sl.new libtdTypeDirData.sl
```

8. Start IMS from the second terminal window still logged in as root.

2.9 How to Correct the Time Zone set-up

If the time zone of your pre-installed IMS is wrong you must correct this before you start History logging. To do this, log in as root and execute **/sbin/set_parms time.**

2.10 How to Re-start AdvaInform Software Manually

To re-start the AdvaInform software manually, you must log in as the root user. Normally, only the system administrator has access to root. However you can temporarily log in as root from a HP-UX session where you are logged in at another level, for example: ENGINEER.

To re-start the AdvaInform software manually:

1. Open a terminal window.
2. Set user to root. At the $ prompt, enter: **su root** and then enter your root password.
3. At the # prompt, enter: **`/opt/advant/Startup/bin/IMSstart`**

   IMSstart has these options: IMSstart [-oracle] [-v] [-log] [-nosup]

-oracle:	Only restarts the Oracle database. If -oracle is left out, Oracle is started only if it is not currently running. You should normally never use the parameter oracle.
-v:	The start script is executed in verbose mode. Messages during start-up are presented on the screen.
-log:	Invokes file logging of all processes started (/var/opt/advant/log). Only working together with "-nosup".
-nosup:	Supervision of processes are disabled

   Normally, -log, -nosup and -oracle should not be used.
4. To exit session as root, enter: **exit** at the # prompt.

The script /opt/advant/Startup/bin/IMSstart is executed from the system start-up file and starts all AdvaInform processes such as the Real-Time Accelerator Board kernel, Oracle etc. IMSstart starts all installed AdvaInform options. Before starting AdvaInform, the IMSstart script always stops all known AdvaInform processes except the Oracle processes.

The /var/opt/advant/log/IMS/dcSystem.log contains start-up and supervision logging. The old logfile is always saved as dcSystem.log.old. The log file is not active by default. If you need to analyze the system, activate the log file by setting the system variable **SYSTEM_LOG_ACTIVE** to **Y**, in the configuration file /opt/advant/Startup/etc/dcStartup.env. The normal (default) position is to have **SYSTEM_LOG_ACTIVE** set to **N**.

2.11 Uninterruptible Power Supply UPS

Uninterruptible Power Supply is a hardware option. Installation of the UPS hardware is described in the *Advant Station Hardware User's Guide*. **Make sure that you connect the UPS directly to the first RS-232 port of the Advant Station System Unit.**

If your Advant Station is delivered from ABB with all options installed there are no additional procedures to install the UPS. If the UPS option is purchased after delivery you have to install the corresponding UPS software as well. Read Section 2.5, How to Install Software Options or Patches for instructions. The name of the UPS software is ABB-AI-UPS.

NOTE

The UPS software is for use with the UPS supplied by ABB, and NOT for use with other UPS hardware.

The UPS is configured for a connection towards the first RS-232 port. By default it is also configured to handle the UPS PWA30. These can only support one Advant Station at a time. The UPS software has the ability to support other UPS hardware making it possible to supply several Advant Stations at a time with uninterruptible power. To configure and use such functionality you must contact ABB for instructions.

NOTE

When you install the AdvaInform 2.0 software, the UPS_TYPE environment variable is set to the new UPS type: PWA30. If you have the old UPS types SV520 and SV521 respectively see Section 2.4.9.6, Configuring UPS.

2.12 X-station

The X-station option is best described here in the Installation chapter, because normally you install the software, define which X-terminals you want as clients, and afterwards you just start to work from the X-terminal.

The installation is done as follows, if you have an X-station software license:

1. Verify that the software is installed. You can do this by logging in as root and executing the command “swlist”. If you can see the X-Station software unit in the menu (you may have to scroll down), the option is installed, otherwise install it according to Section 2.5, How to Install Software Options or Patches. The software is distributed on its own CD-ROM.

2. Define which X-terminals the X-station software will be able to handle:
   a. Log in as root and execute the command "sam" - System Administration Manager.
   b. Choose **X Station Administration** from the **Other Utilities** menu in the sam main menu.
   c. Start to add/modify/delete your X-terminal definitions. Before you begin you should have the following information: the hardware address of your X-terminal, and the TCP/IP address of your X-terminal, unless you are not using bootp but NFS is normally used. The hardware address is displayed when you power on your X-terminal. The address begins with "***080009***...". The other definitions are normally defined with the default settings (just press Enter).
3. Now the installation is ready in the AS500 IMS. Go to the X-terminal and define your TCP/IP address and X-station host address, i.e. the Advant Station TCP/IP address. You may have to consult your X-terminal manual to do this.
4. Restart the X-terminal, The X-software will be downloaded from the AS500 IMS.

2.13 Web server Netscape FastTrack

The Netscape FastTrack software is included in IMS. This software includes both the web server Netscape FastTrack and the web browser Netscape Navigator Gold. To install this software perform the following steps:

1. Log on as root.
2. Verify that you have at least 36 MB free disk space in the LVM /opt.
3. Insert the CD labeled AdvaInform SW Miscellaneous.

   See Section 2.4.8.4, Installation with swinstall for how to mount the CD-ROM and how to use swinstall.
4. Mount the CD-ROM
5. Enter **swinstall** to start the installation program with command

   ```
   # swinstall -s /cdrom/Applications
   ```

   Perform the installation of fileset **J1608CA**

   When the installation is complete you can start the FastTrack server with command.

   ```
   # /opt/ns_fasttrack/httpd-default/start
   ```

   Even though the Installation is done you must still do the configuration described in Section 3.6.14, Web server Netscape FastTrack before the web server will work correctly.
6. By setting NS_HTTPD to 1 in file /etc/rc.config.d/ns-httpd the Web server will be automatically restarted after each reboot.

2.14 How to Extend a Logical Volume After Installation

You should not have to extend a logical volume as long as you follow all recommendations regarding logical volumes as described in Section 2.4.3, Calculate Required Disk Space. However, in the unlikely event that you are required to extend a logical volume after installation, use the lvextend command. An example is provided below. If you need further information, refer to the applicable manpage.

Example:

```
$ bdf                         /*Note the logical volume to be extended*/
$ su
```

/*** set the station to single user mode

```
# shutdown 0
```

/*** unmount the file system to be extended if the bdf command shows it as mounted

```
# bdf
# umount /home
```

/*** extend the logical volume.

```
# lvextend -L 2200 /dev/vg00/lvol4
# extendfs /dev/vg00/rlvol4
# reboot
```

/***2200 makes the size of the /home logical volume 2.2 gigabytes (2200 meg.)

Chapter 3 Configuration

3.1 Overview

This chapter covers the following configuration, set-up, and administrative functions:

- Section 3.2, Database Configuration Requirements for MOD 300. This section describes how to configure objects in the MOD 300 database to support an AdvaInform node and AdvaInform software packages.
- Section 3.3, How to Configure the IMS to Support Peripheral Devices. This section describes how to add peripherals such as printers, disk drives, DAT drives, UPS and so on.
- Section 3.4, Tuning the Oracle Database.
- Section 3.5, Uninterruptible Power Supply - UPS.
- Section 3.6, Administration and Maintenance Functions. This section includes:
  - Section 3.6.1, How to Configure Control Network Parameters
  - Section 3.6.2, How to Define and Manage Users
  - Section 3.6.4, System Variables
  - Section 3.6.5, System Messages
  - Section 3.6.6, Real Time Accelerator Configuration (Master only)
  - Section 3.6.7, Node Broker (Master only)
  - Section 3.6.8, RTA Language (Master only)
  - Section 3.6.9, MasterBus 300E (Master only)
  - Section 3.6.10, MasterBus 200 (Master only)
  - Section 3.6.11, Time Synchronization and Time Setting
  - Section 3.6.12, How to set-up Mail

3.2 Database Configuration Requirements for MOD 300

The Advant Station with AdvaInform software must be represented in the MOD 300 database by a GENERICD object (Generic_DPSS templet in Multibus-based Configurator). This object is a child of the AREA object and represents a subsystem in the area. Children objects beneath the GENERICD object establish the functionality for that node (for example, the HISTORY object is required for nodes that run AdvaInform History. The database object hierarchy related to the GENERICD object is shown in Figure 3-1. The applicable objects are listed in Table 3-1.

The GENERICD database object (Generic_DPSS templet) is inserted into the MOD 300 database hierarchy and its object attributes are defined via either the AdvaBuild Structure Builder and Template Builder respectively as described in the *AdvaBuild Basic Functions User's Guide*, or via a Multibus-based Configurator/Data Processor as described in the *Configurator User's Guide*.

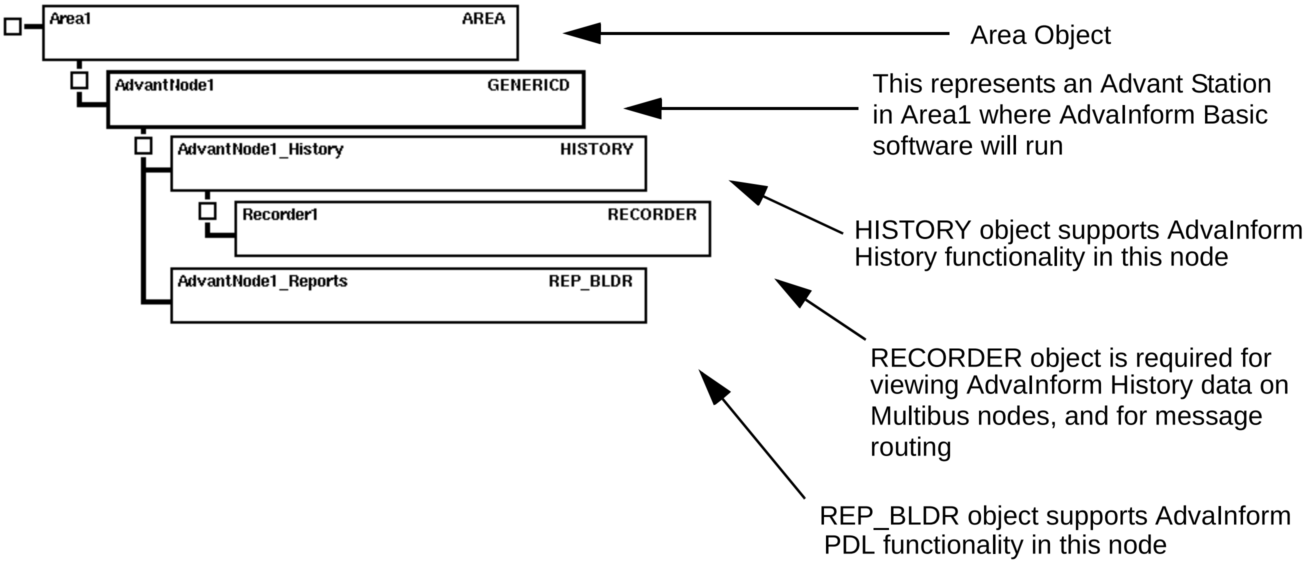

Area1
AREA
AdvantNode1
GENERICD
AdvantNode1_History
HISTORY
Recorder1
RECORDER
AdvantNode1_Reports
REP_BLDR
Area Object
This represents an Advant Station in Area1 where AdvaInform Basic software will run
HISTORY object supports AdvaInform History functionality in this node
RECORDER object is required for viewing AdvaInform History data on Multibus nodes, and for message routing
REP_BLDR object supports AdvaInform PDL functionality in this node

Figure 3-1. MOD 300 Database Hierarchy Related to GENERICD Object

Table 3-1. Object Types for IMS Node

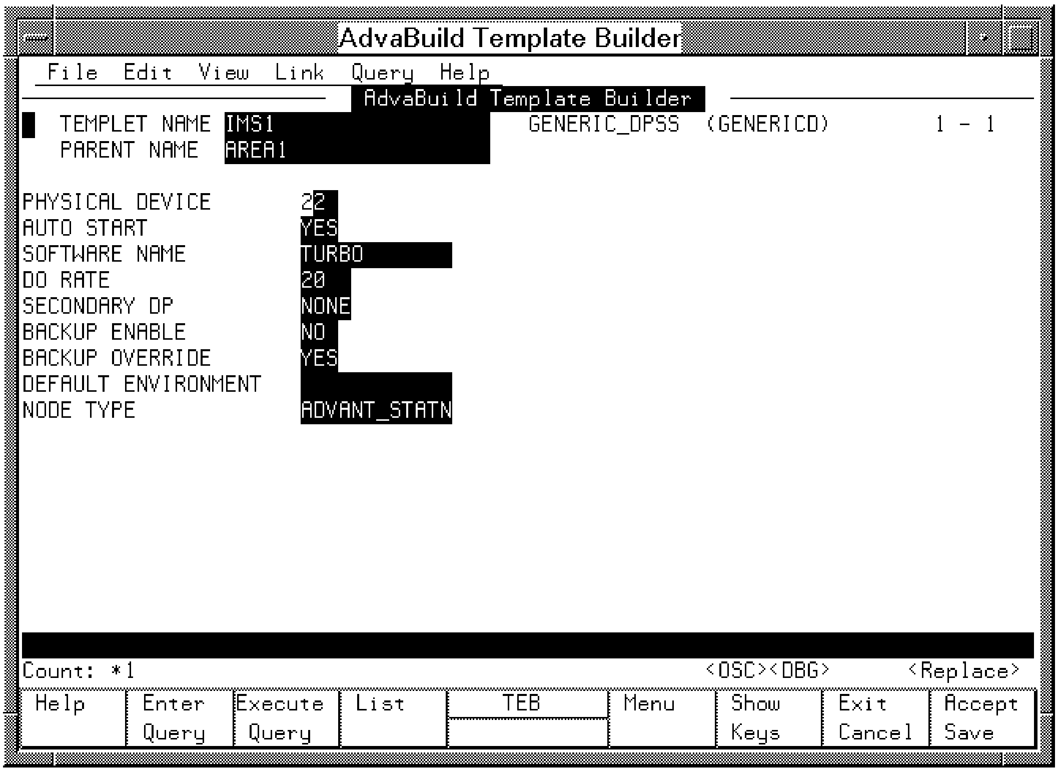
OBJECT TYPE	PURPOSE	REFERENCE
GENERICD	One GENERICD object must be inserted in the database to support an IMS. It is a child of the AREA object. It establishes an Advant Station node in the configuration area. Children of the GENERICD object determine the functional characteristics of the subsystem.	Section 3.2.1, GENERICD Object
HISTORY	A HISTORY object must be inserted as a child of the IMS GENERICD object, if the IMS runs AdvaInform History, and messages are to be sent to History.	Section 3.2.2, Database Objects for History
RECORDER	A RECORDER object is required for viewing AdvaInform History data on Multibus nodes and for message routing.	Section 3.2.2, Database Objects for History
REP_BLDR	A REP_BLDR object must be inserted as a child of the IMS GENERICD object if TCL and/or Batch 300 are going to send data to PDLs on the IMS.	Section 3.2.2, Database Objects for History

Table 3-1. Object Types for IMS Node (Continued)

OBJECT TYPE	PURPOSE	REFERENCE
AREA	Certain object attributes must be configured to support message routing in areas whose nodes route messages to History.	Section 3.2.2, Database Objects for History
MSG_ROUT	Certain object attributes must be configured to support log-on and alarm-acknowledge message routing from Multibus-based Console nodes.	Section 3.2.2, Database Objects for History

3.2.1 GENERICD Object

The Template Builder view of the GENERICD object is shown in Figure 3-2.



```
  TEMPLET NAME IMS1                      GENERIC_DPSS  (GENERICD)        1 - 1
  PARENT NAME  AREA1

PHYSICAL DEVICE       22
AUTO START            YES
SOFTWARE NAME         TURBO
DO RATE               20
SECONDARY DP          NONE
BACKUP ENABLE         NO
BACKUP OVERRIDE       YES
DEFAULT ENVIRONMENT
NODE TYPE             ADVANT_STATN

Count: *1
```

Figure 3-2. GENERICD Object, Template Builder window

The GENERICD object attributes are described below.

PHYSICAL DEVICE

This is the DCN node address. This must be the same DCN address that was defined for the Advant Station during software loading. The address is expressed as a decimal number. Any number from 1 to 255 is valid; however, addresses with a lower order hexadecimal value of one are reserved for configurator/data processor (CDP) nodes and should not be used for the AdvaInform node, Table 3-2. Be sure to enter a decimal number in the PHYSICAL DEVICE field.

Table 3-2. DCN Addresses for Nodes with Configurator Software

Address (Hex)	Decimal Equivalent
01	**1**
11	**17**
21	**33**
31	**49**
41	**65**
51	**81**
61	**97**
71	**113**
81	**129**
91	**145**
A1	**161**
B1	**177**
C1	**193**
D1	**209**
E1	**225**
F1	**241**

AUTO START

This field determines whether or not the node starts automatically when the software is downloaded. The only valid choice for a GENERICD node is **YES**.

SOFTWARE NAME

This field determines the functionality of a Multibus-based GENERICD node. This field is not applicable for the Advant Station. Leave it at its default value.

DO RATE

This attribute is not applicable for the IMS.

SECONDARY DP, BACKUP ENABLE, and BACKUP OVERRIDE

These fields have not been implemented. Leave them at their default values.

DEFAULT ENVIRONMENT

This attribute is not applicable for the IMS.

NODE TYPE

This field specifies the hardware platform for the GENERICD node. The choices are:

MOD300_NODE	This option is for a Multibus-based node.
ADVANT_STATN	This option is for an Advant Station.

The only valid choice for an IMS is ADVANT_STATN.

3.2.2 Database Objects for History

A HISTORY object must be inserted as a child of the GENERICD object that represents the IMS where the History software runs. Then a RECORDER object must be inserted as a child of the HISTORY object. These objects do not have any attributes that need to be configured to support AdvaInform History. However, they must exist in the database so messages can be routed to the node. They also support the ability to present AdvaInform History data on Multibus-based trend displays.

If you need to route messages to history in the Advant Station, the following database objects related to message routing must be configured:

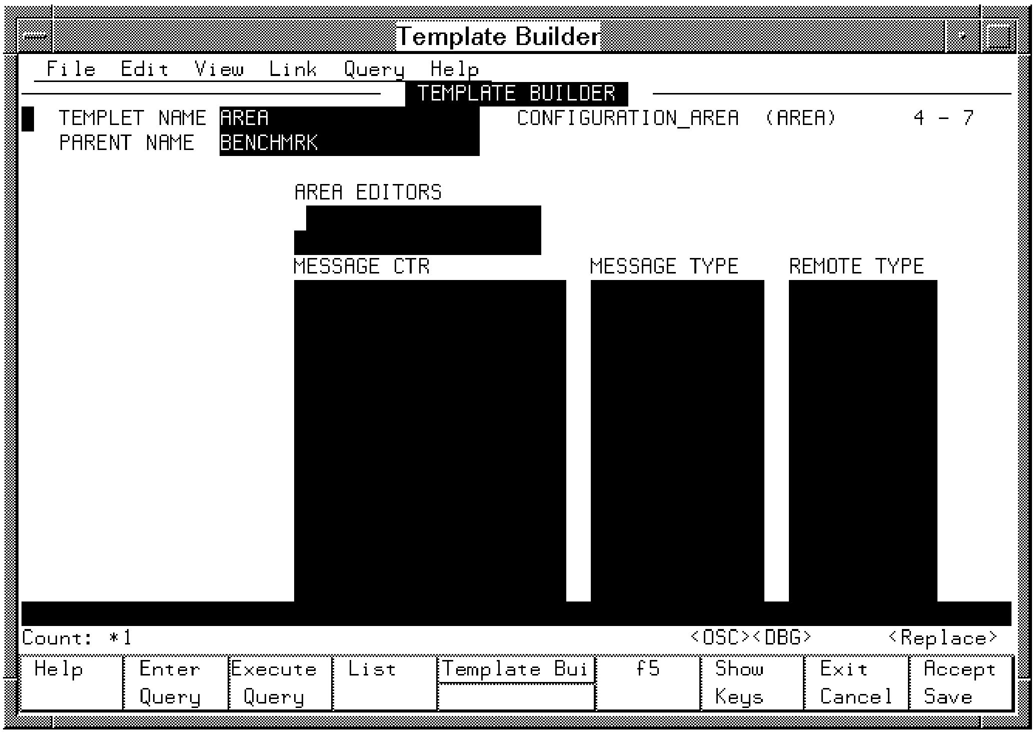
- The AREA object for any configuration area whose nodes route CCF alarm, CCF event, TCL event, and TCL billboard messages to History.

The MSG_ROUT (message routing) object for any Multibus-based console that routes log on and alarm acknowledge messages to History.

3.2.2.1 AREA Object

You must configure the Message Center Edit Window in any AREA object whose children nodes route messages to History. The Message Center edit window, Figure 3-3, is used to specify the destinations of messages originating in this configuration area. This window starts on page 4 of the AREA object template view.

During runtime, CCF event, CCF alarm, TCL event, TCL billboard and system error messages can be generated by the system. The edit window has one line for each type of message.



TEMPLET NAME AREA
PARENT NAME BENCHMRK
CONFIGURATION_AREA (AREA) 4 - 7

AREA EDITORS

MESSAGE CTR
MESSAGE TYPE
REMOTE TYPE

Count: *1 <OSC><DBG> <Replace>

Figure 3-3. AREA Object, Template Builder View, Page 4 w/MESSAGE CTR window

The line format is:

MESSAGE CTR	This is the object ID for the device or History/Logger package (Console, OS, History, Logger, Generic DPSS or LCP) to receive the messages. The ID must be the same as the one assigned when the object was inserted in the MOD 300 database.

MESSAGE TYPE	Is the type of message. Valid entries for type are:

CCF_ALARM

CCF_EVENT

CCF_BOTH (both CCF alarm messages and event messages)

TCL_EVENT

TCL_BILLBOARD (used to designate TCL unit messages that are generated by TCL MESG and REPLY statements and programmable unit alarms generated by TCL UNIT_ALARM statements)

TCL_BOTH (both TCL event messages and billboard messages)

SYSTEM Not routed to a History package

REMOTE TYPE	This field is only applicable for systems using multiple configurators, and when the message destination is in another configurator domain. The entry specifies the object type and must be one of the following: **CONSOLE**,**LOGGER**, **GENERIC_DPSS**, **LCP**, **HISTORY**

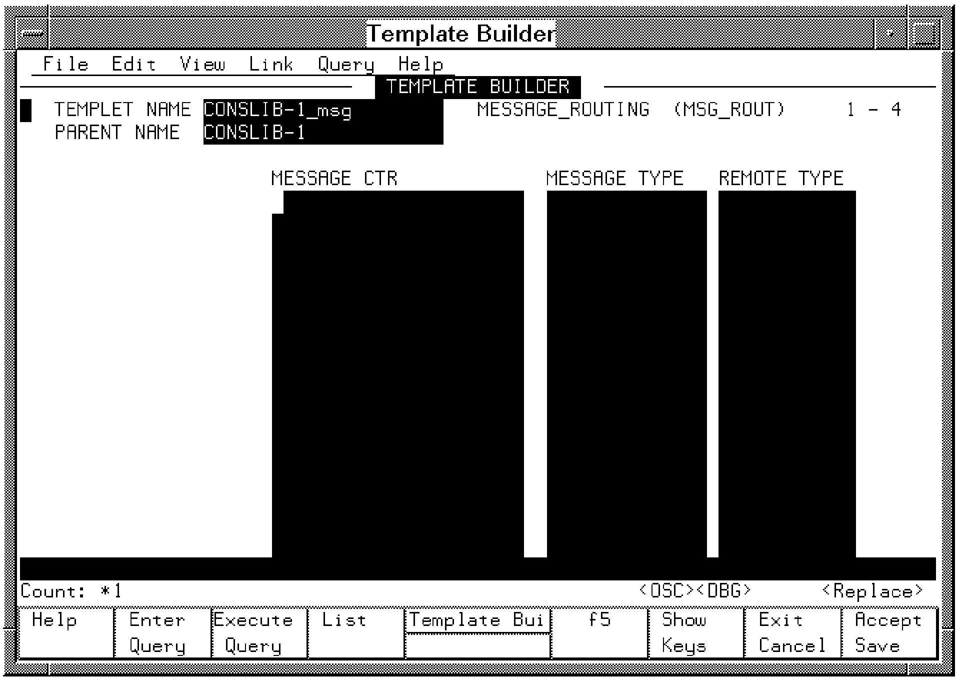
Message Center Entries for Historical Services

You can route CCF alarm, CCF event, TCL event, and TCL billboard messages from the area to AdvaInform history. The example below shows how configure the Area object to route all types of messages to HISTORY1. **HISTORY1** is the object ID for the History object.

HISTORY1	**CCF_BOTH**
HISTORY1	**TCL_BOTH**

3.2.2.2 MSG_ROUT Object

This object must be inserted as a child of the CONSLIB object of any MOD300 console or Advant OS nodes. It provides the means for you to configure how console log on and/or alarm acknowledgment messages are routed to AdvaInform History nodes and loggers, Figure 3-4.



```
TEMPLET NAME CONSLIB-1_msg          MESSAGE_ROUTING  (MSG_ROUT)     1 - 4
PARENT NAME  CONSLIB-1

                      MESSAGE CTR            MESSAGE TYPE   REMOTE TYPE

Count: *1                                         <OSC><DBG>       <Replace>
```

Figure 3-4. MSG_ROUT Object, TEB window

This object has the following attributes:

MESSAGE CTR

To route messages, enter the message destinations and the types of messages to be routed to these destinations in the Message Ctr edit window.

Indicate the message destination by entering the object ID of the destination package. For message type enter any one of the following:

CONS_LOG_ONS	Console log on
CONS_ACKS	Console alarm acknowledgment
CONS_BOTH	Both console log on and console alarm acknowledgment

There is a limit of 256 destinations for messages. Messages of a specific type from a configuration area can be sent to no more than 40 destinations.

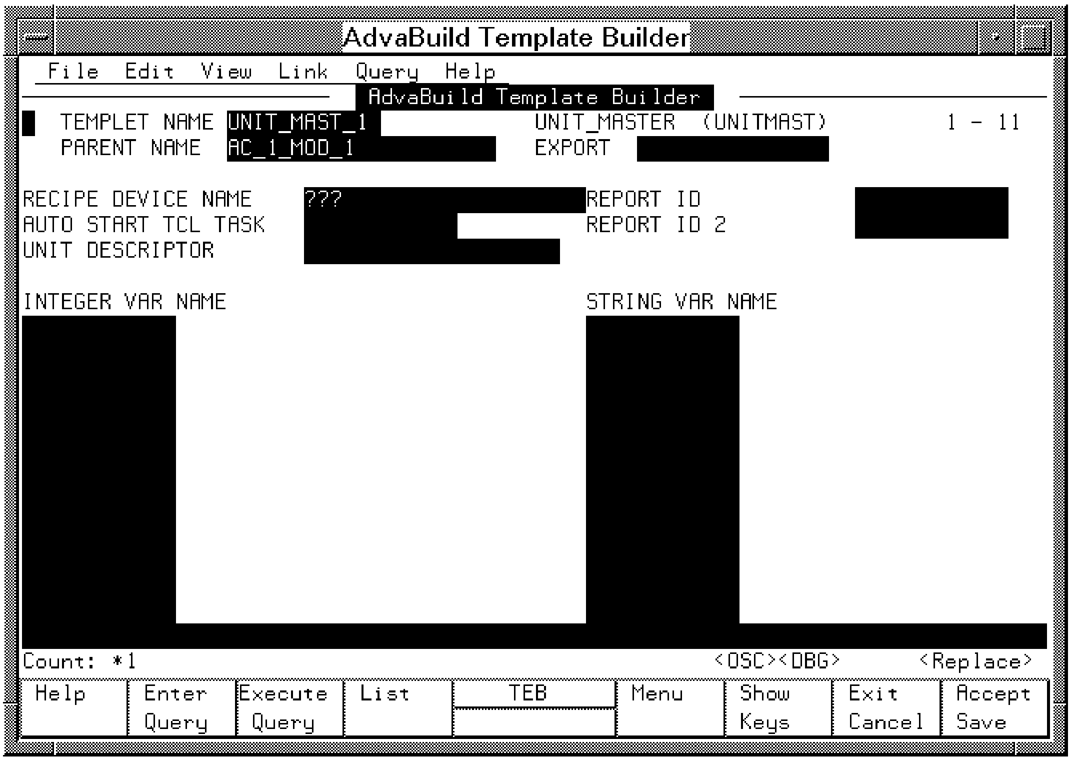
REMOTE TYPE

This field is only applicable for systems using multiple configurators, and when the message destination is in another configurator domain. The entry specifies the object type and must be one of the following: **CONSOLE**,**LOGGER**, **GENERIC_DPSS**, **LCP**, **HISTORY**

3.2.3 Database Objects for Reports and PDL

A REP_BLDR object must be inserted as a child of the GENERICD object that represents the Advant Station where the History and Reports software runs. This object does not have any attributes that need to be configured to support the Advant Station. However, it must exist in the database to support PDL functionality.

In addition you must configure the REPORT ID and REPORT ID 2 fields on the UNIT_MASTER object of any unit that will send batch data to Production Data Logs (PDLs) on the Advant Station, Figure 3-5.



TEMPLET NAME UNIT_MAST_1

PARENT NAME AC_1_MOD_1

UNIT_MASTER (UNITMAST) 1 - 11

EXPORT

RECIPE DEVICE NAME ???

AUTO START TCL TASK

UNIT DESCRIPTOR

REPORT ID

REPORT ID 2

INTEGER VAR NAME

STRING VAR NAME

Count: *1 <OSC><DBG> <Replace>

Figure 3-5. UNIT_MAST Object

To establish the Advant Station as the destination for recorded data (TCL RECORD statements), configure the REPORT ID and REPORT ID 2 fields on the Unit Master object (template). These fields are used to specify the Reports software package(s) (up to two) that will process batch data for the unit corresponding to the Unit Master object you are configuring.

There are two Reports packages that can run in the Advant OCS with MOD 300 software: Multibus-based Reports Services or AdvaInform Reports. The Report ID must be entered exactly as it is defined in the TEMPLET NAME field on the REP_BLDR object for the node where the Reports package runs.

Batch recording and tracing information can be stored redundantly by configuring two Report IDs.

3.3 How to Configure the IMS to Support Peripheral Devices

Instructions for making cable connections between the Advant Station and the various peripherals are provided in the appropriate *Advant Station 5xx*[1] *Hardware User's Guides*.

In addition to hardware considerations, there are certain procedures that you must perform in HP-UX to make the devices operational. This section provides a brief overview of these procedures and describes device-specific parameters required for peripherals connected to the Advant Station in the Advant OCS.

Device Files

The HP-UX operating system uses special files called device files to perform I/O to peripheral devices. Each peripheral in your system requires an associated device file. There are pre-defined device files already existing on the HP-UX system. Device files are located in the `/dev` directory, or in one of its sub-directories. If a device file that is appropriate for your application already exists you can use it, otherwise you must create a new one.

If you use SAM (System Administration Manager) to add an HP peripheral, SAM automatically creates the device file. If you are not using SAM, or if you choose not to have SAM create the device file, you must use the `mknod` function to create the device file.

The SAM function is accessible via the **Maintenance** menu item in the **Settings** menu. You must be logged in to the IMS Menu as IMS user with SYSTEM category (for example, ocsmgr) to use the **Maintenance** menu item; otherwise all **Settings** menu items will be dimmed and not accessible. Also, you will require the root password to access SAM in HP-UX.

You invoke `mknod` via a command line in a terminal window. You can open a terminal window via the **IMS Terminal Window** menu item in the **Station** menu.

Other procedures may also be required. Refer to the HP documentation for details.

3.3.1 Printer Setup

3.3.1.1 Overview

You can connect a printer directly to any node on the TCP-IP network or connect it directly to the TCP-IP network. To use a connected printer, a printer queue must be defined in the station. A printer queue can use a local, remote or network based printer. One physical printer can have more than one printer queue configured.

---

[1] 5xx stands for 515, 520, 520i or 530.

You can use the SAM utility to set up a printer. To access the printer setup functions:

1. Choose **Maintenance** from the **Settings** menu in the IMS menu. This opens the System Administrator Manager window, Figure 3-6.

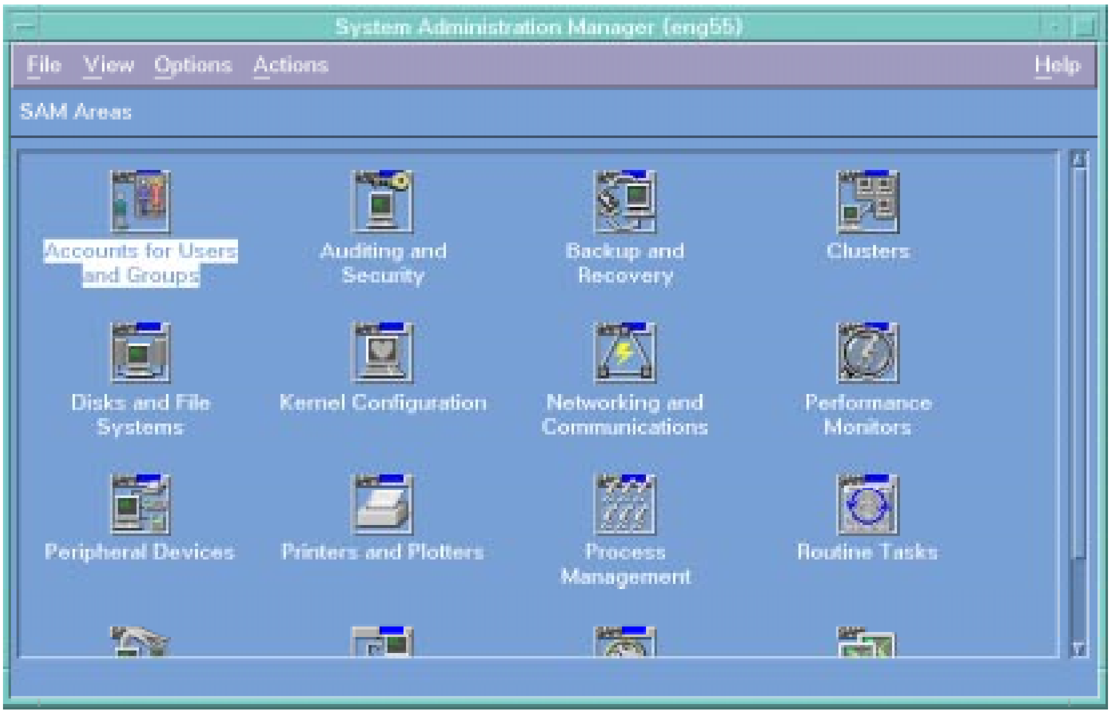


Figure 3-6. SAM Window

2. Click on the **Printers and Plotters** icon. This opens the Printers and Plotters area, Figure 3-7.

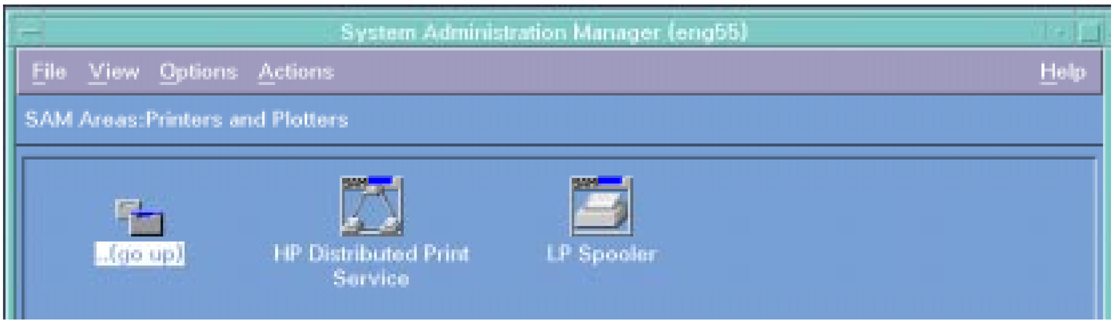

System Administration Manager (eng55)
File
View
Options
Actions
Help
SAM Areas:Printers and Plotters
..(go up)
HP Distributed Print Service
LP Spooler

Figure 3-7. SAM Area Printers and Plotters

3. Click on the **LP Spooler** icon. This opens the Printers and Plotters => LP Spooler area, Figure 3-8.

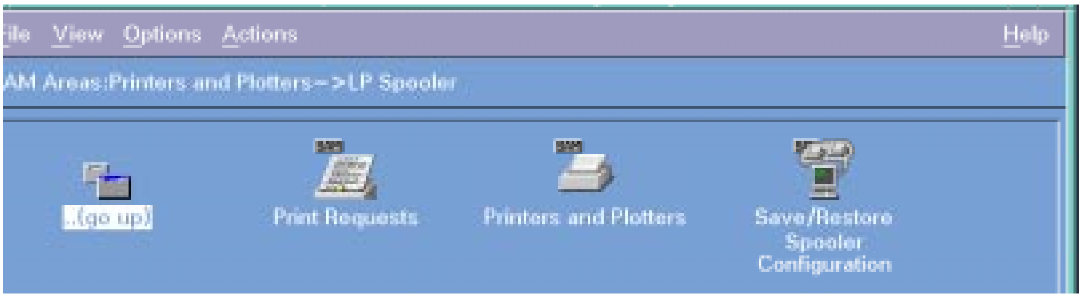

ile View Options Actions
Help
AM Areas:Printers and Plotters−>LP Spooler
..(go up)
Print Requests
Printers and Plotters
Save/Restore Spooler Configuration

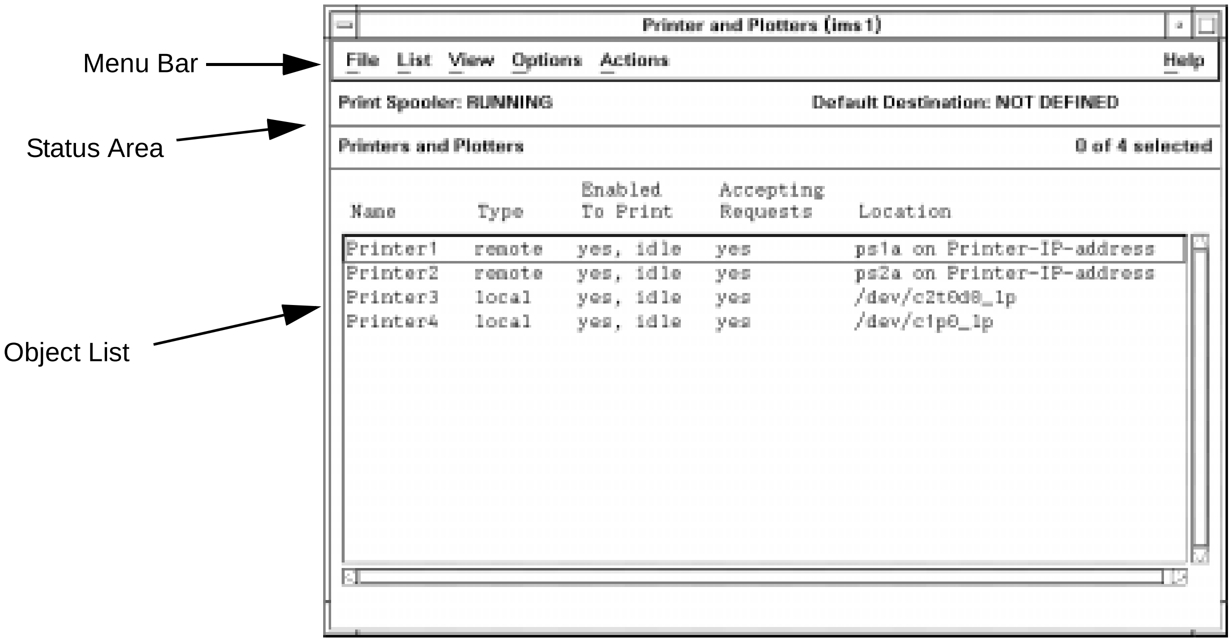
Figure 3-8. SAM Areas: Printers and Plotters => LP Spooler

4. Click on the **Printers and Plotters** icon. This opens the Printer Configuration window, Figure 3-9. Printer Configuration can be used to add, delete, enable and disable printer queues. You can also show all current print requests queued.

The Printer Configuration window has three different presentations:

- The **Printer and Plotters** presentation shows all configured printer queues in the station.
- **Print Requests** shows all current print requests queued in the station.
- **Save/Restore Spooler Configuration** shows a snapshot of the most recently saved printer configuration.

You select one of these three presentations via the **List** menu. For each of the three presentations, the window is divided into three sections: Menu Bar, Status Area and Object List, Figure 3-9.



Print Spooler: RUNNING
Default Destination: NOT DEFINED

Printers and Plotters
0 of 4 selected

Name	Type	Enabled To Print	Accepting Requests	Location
Printer1	remote	yes, idle	yes	ps1a on Printer-IP-address
Printer2	remote	yes, idle	yes	ps2a on Printer-IP-address
Printer3	local	yes, idle	yes	/dev/c2t0d0_lp
Printer4	local	yes, idle	yes	/dev/c1p0_lp

Figure 3-9. Printer Configuration Main Window (Printers and Plotters)

Menu Bar

The menu bar is the same for each of the three presentations, although the functions available via the **Actions** menu differ. The **File** menu contains the **Exit** function for exiting the Printer Configuration menu, Section 3.3.1.6, How to Exit the Printer Configuration Window. The **List** menu provides three options for selecting one of the three Printer Configuration presentations. The View and Options menus provide functions for manipulating the selected presentation, Section 3.3.1.5, Manipulating the Presentation. The functions provided under the **Actions** menu are described separately for each presentation in the subsequent sections.

Status Area

The status area is located just below the Menu Bar. It displays the following information:

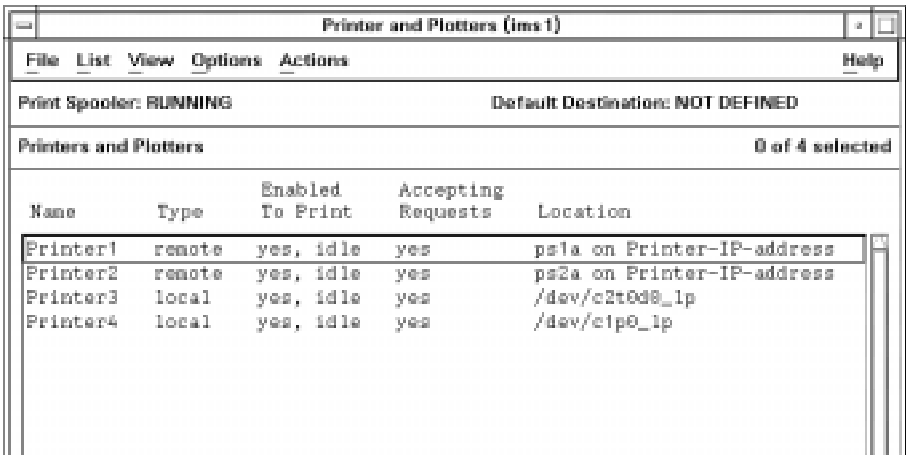
- Type of objects in the Object List (printers & plotters or print requests).
- Number of objects selected in the Object List.
- Whether or not the print spooler is running (RUNNING or STOPPED).
- Name of the default printer.

Object List

The contents of the object list depends on the presentation and is described separately for each presentation.

3.3.1.2 The Printer and Plotters Presentation

This presentation, Figure 3-10, lets you add a printer (local, remote, or network based), stop the printer spool, or show common problems. These functions are available via the **Actions** menu. To select the Printer and Plotters presentation, choose **Printers and Plotters** from the **List** menu.



Print Spooler: RUNNING
Default Destination: NOT DEFINED

Printers and Plotters
0 of 4 selected

```
                       Enabled      Accepting
 Name        Type      To Print     Requests       Location
Printer1    remote    yes, idle    yes            ps1a on Printer-IP-address
Printer2    remote    yes, idle    yes            ps2a on Printer-IP-address
Printer3    local     yes, idle    yes            /dev/c2t0d0_lp
Printer4    local     yes, idle    yes            /dev/c1p0_lp
```

Figure 3-10. Printer Configuration Main Window (Printers and Plotters).

The Object List presents information about configured printer queues in the station. You can scroll through the list vertically or horizontally as necessary.

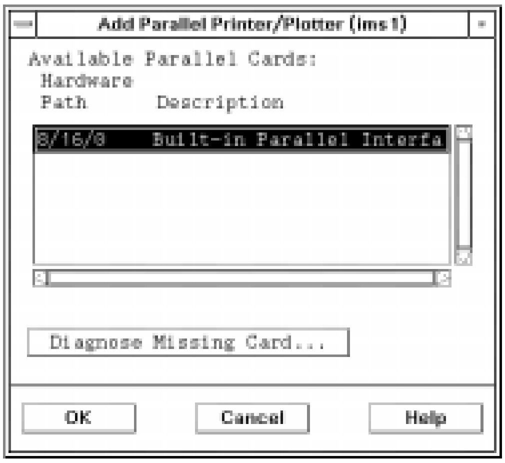
Each printer queue has a number of attributes, which are displayed in columns in the list, with attribute titles at the top of each column. The following attributes are shown in the Printer List for each configured printer:

Name	The name by which the printer queue is known to the station. You can use this name to specify the printer queue as a destination for printouts.
Enable To Print	Shows whether the printer or plotter is currently enabled (yes) or disabled (no). If a printer or plotter is enabled it also shows if the printer is currently idle or busy. For an unconfigured printer the value shown is the currently recorded cluster-wide status of the printer.
Accepting Requests	Shows whether the print spooler is currently accepting requests (yes) or rejecting requests (no) for the printer or plotter or class. For an unconfigured resource the value shown is the currently recorded cluster-wide status of the object.
Type	Indicates whether the printer is connected locally, remotely or to a network-based printer.
Location	Shows "where" the station thinks the printer is located. For local printers, this is the device file name. The device file name is set by the system when a local printer is configured. For remote printers, it is the remote printer queue name used when the printer was added and the name of the remote system to which the printer is connected. For network printers, it is a dash (-).

How to Add a Local Printer

This function lets you add either a parallel printer or serial printer to the local node. To add a local printer, choose **Add Local Printer** from the **Actions** menu. This displays a sub-menu for selecting either a parallel or serial printer. Choose either **Add Parallel Printer/Plotter** or **Add Serial (RS-232) Printer/Plotter** from the sub-menu.

If you choose **Add Parallel Printer/Plotter**, the following dialog is displayed, Figure 3-11.



Add Parallel Printer/Plotter (ims1)

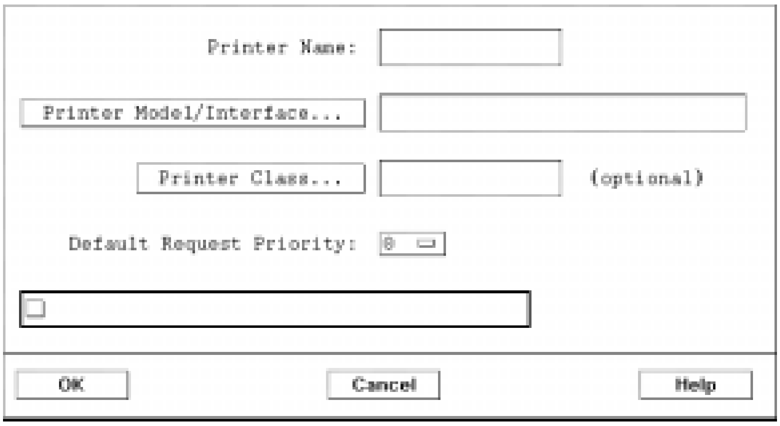
Available Parallel Cards:
Hardware
Path Description

8/16/0 Built-in Parallel Interfa

Figure 3-11. Parallel Printer Hardware Location Dialog Box

This dialog box presents the available parallel interface cards. Only one parallel interface card (2.0.6 Parallel Interface) is available in the Advant Station. Press **OK** to select this parallel interface card.

This displays the Add Local Printer dialog box, Figure 3-12.



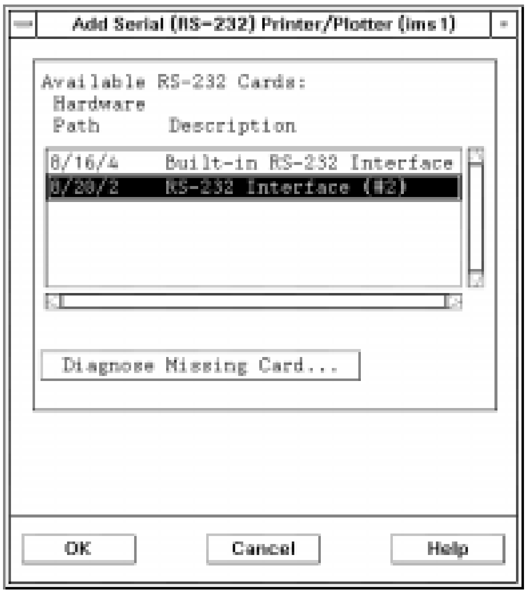
Default Request Priority: 0

Figure 3-12. Add Local Printer - Dialog Box

The following data is required when you add a printer queue for a parallel printer:

Printer Name	Enter the name of the printer queue you want to add. The name can be any unique combination of up to 14 alphanumeric characters and underscores.
Printer Model/Interface	Choose the printer model that you want to use for this printer queue. Enter the name of the printer model or select among the currently available models by pressing the **Printer Model/Interface** button
Printer Class	This item is not used within AdvaInform and must not be changed.
Default Request Priority	This item is not used within AdvaInform and must not be changed.
Make this the system default printer	If you want this printer queue to be the system default printer queue, press the toggle button to the left of the text. If a printer request is issued without specifying a printer destination, the request is directed to the system default printer.

If you choose **Add Serial (RS-232) Printer**, the following dialog box is displayed, Figure 3-13.



```
Available RS-232 Cards:
 Hardware
 Path       Description
8/16/4      Built-in RS-232 Interface
8/20/2      RS-232 Interface (#2)
```

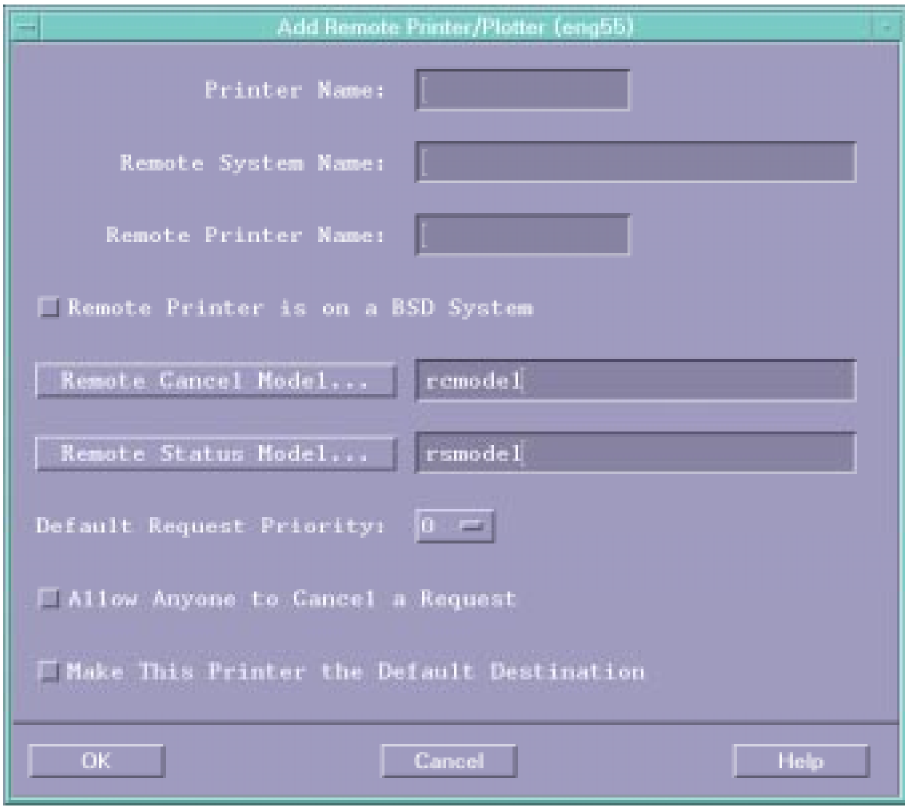
Figure 3-13. Serial Printer Hardware Location Dialog Box

Two serial printer ports are available within the Advant Station.

Select the serial printer port that you want to use and press **OK**. This displays the Add Local Printer dialog. This is the same dialog you use to configure a parallel printer, Figure 3-12. This dialog operates the same way whether you are configuring a parallel or serial printer.

How to Add a Remote Printer

This function lets you add a printer queue that is using another printer queue on a remote host on the TCP/IP network. The printer queue in the remote host must be configured in advance. To add a remote printer, choose **Add Remote Printer** from the **Actions** menu. This displays the Add Remote Printer dialog, Figure 3-14.


Add Remote Printer/Plotter (eng55)
Printer Name:
Remote System Name:
Remote Printer Name:
☐ Remote Printer is on a BSD System
☐ Allow Anyone to Cancel a Request
☐ Make This Printer the Default Destination
OK
Cancel
Help

Remote Cancel Model... rcmodel

Remote Status Model... rsmodel

Default Request Priority: 0

Figure 3-14. Add Remote Printer Dialog Box

The following data is required when you add a printer queue for a remote printer:

Printer Name	Enter the name of the printer queue you want to add. The name can be any unique combination of up to 14 alphanumeric characters and underscores. It is recommended that you use the name used in the remote host followed by the remote host name.
Remote System Name	Enter the name of the remote host. This name must be defined /etc/hosts.
Remote Printer Name	Enter the name of the printer queue in the remote host.This name must be defined /etc/hosts.
Remote Cancel Model	This is a script or program you use to cancel a print request on the remote host. One Remote Cancel Model, named rcmodel, is available in Advant Station. You can use rcmodel for remote hosts of type Advant Station 500 Series and HP workstations.
Remote Status Model	This is a script or program you use to retrieve status information about a print request sent to a remote host. One Remote Status Model, named rsmodel, is available in Advant Station. You can use rsmodel for remote hosts of type Advant Station 500 Series and HP workstations.
Default Request Priority	This item is not used within AdvaInform and must not be changed.
Make this the system default printer	If you want this printer queue to be the system default printer queue, press the toggle button to the left of the text. If a you issue a printer request without specifying a printer destination, the request is directed to the system default printer.
Allow anyone to cancel a request	By activating this toggle button, you allow any user to cancel your print request for this printer queue.
The remote printer is on a BSD system	If the remote printer is connected to, or if your print request will pass through, a Berkley Software Distribution (BSD) system, activate this toggle button.

How to Add a Network-based Printer

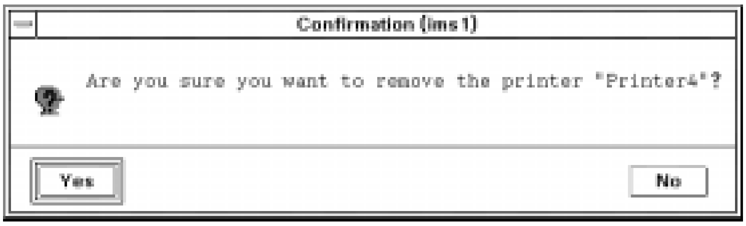
This function adds a printer queue to a printer that is connected directly to the TCP/IP network. Adding a network-based printer or plotter to the local system requires that the HP JetDirect software is installed on the local system.

The following data is required when you add a printer queue for a network printer:

Printer Name	Enter the name of the printer queue you want to add. The name can be any unique combination of up to 14 alphanumeric characters and underscores.
Printer Node Name	Enter the host name of the printer. The printer must be configured on the TCP-IP network and given a host name. If not, follow the instructions in Configure network printer, below.
Printer Model/Interface	Choose the printer model that you want to use for this printer queue. Enter the name of the printer model or select among those currently available by pressing the **Printer Model/Interface** button.
Printer Class	This item is not used within AdvaInform and must not be changed.
Default Request Priority	This item is not used within AdvaInform and must not be changed.
Make this the system default printer	If you want this printer queue to be the system default printer queue, press the toggle button to the left of the text. If you issue a printer request without specifying a printer destination, the request is directed to the system default printer.

How to Remove a Printer

To remove a printer, select a printer queue in the Object List and choose **Remove Printer** from the **Actions** menu. This displays the Remove Printer confirmation box, Figure 3-15. While the printer queue is being removed, the print spooler is stopped. If any print job is running, let the print job finish running before you remove the printer to avoid losing the print job.



Are you sure you want to remove the printer "Printer4"?

Figure 3-15. Remove Printer Confirmation

How to Enable Printer

Select a disabled printer queue in the Object List, then choose **Enable Printer** from the **Actions** menu. The Status for the disabled printer is set to enabled, idle. The printer can now accept print requests again.

How to Disable Printer

Select a printer queue in the Object List and then choose **Disable Printer** from the **Actions** menu. The Status for the disabled printer is set to disabled. A disabled printer cannot accept any print requests.

How to Set a Printer as System Default Printer

Select the printer in the Object List that you want to use as system default printer and then choose **Set as System Default Printer** from the **Actions** menu. If a printer request is issued without a specific printer destination, the request is directed to the system default printer.

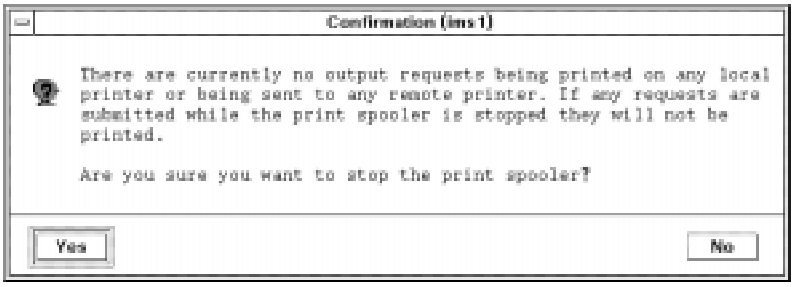
How to Start up Print Spooler

If the print spooler is stopped, choose **Start up Print Spooler** from the **Actions** menu to reactivate it. The lp spooler process is started in the system.

When this menu item is selected, a confirmation box is displayed as shown in Figure 3-16. It is recommended that you not use a log file for all print requests because this file may grow too large. Respond **no** to the prompt.

How to Shut Down the Printer Spooler

To shut down the printer spooler, choose **Shut down Print Spooler** from the **Actions** menu. This shuts down the lp spooler state. Requests in the process of printing when the lp spooler is shut down are reprinted when the lp spooler is restarted.

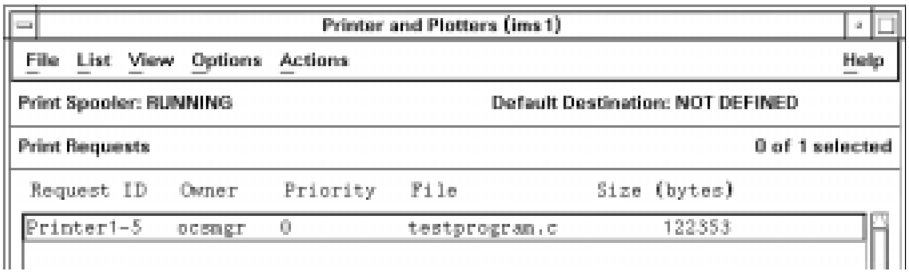


```
There are currently no output requests being printed on any local
printer or being sent to any remote printer. If any requests are
submitted while the print spooler is stopped they will not be
printed.

Are you sure you want to stop the print spooler?
```

Figure 3-16. Shut Down Printer Spooler Confirmation

3.3.1.3 The Print Requests Presentation

The Print Requests presentation shows current print requests in the station, Figure 3-17. You can use this presentation to cancel a request, or start and stop the print spooler. These functions are available via the **Actions** menu. To display the Printer Requests presentation, choose **Print Requests** from the **List** menu.



Print Spooler: RUNNING
Default Destination: NOT DEFINED

Print Requests
0 of 1 selected

Request ID	Owner	Priority	File	Size (bytes)
Printer1-5	ocsmgr	0	testprogram.c	122353

Figure 3-17. Printer Configuration Main Window (Print Requests)

The Object List in the Printer Requests presentation provides information about current print requests in the station. You can scroll through the list vertically or horizontally as necessary.

Each print request has a number of attributes, which are displayed in columns in the list, with attribute titles at the top of each column. The following attributes are shown in the Print Request List for each printer request:

Request ID	The identification number of the print request.
Owner	The user id of the print request submitter.
Priority	Priority of the print request. Print request priority must be equal to or greater than the fence priority of the printer queue to which it is sent. If not, the request remains in the print queue.
File	Name of the file being printed.
Size	Size (in bytes) of the print request.

How to Cancel a Request

To cancel a print request, first select the print requests that you want to cancel from the Object List, then choose **Cancel Request** from the **Actions** menu.

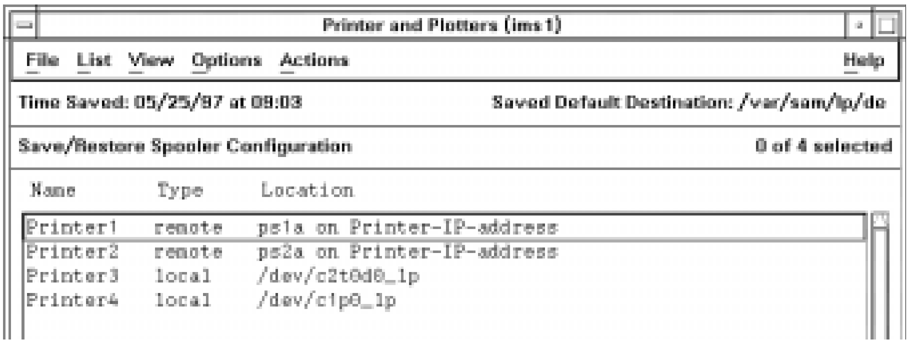
How to Start and Stop the Print Spooler

These functions are equivalent to the ones described for the Printer and Plotters presentation in Section 3.3.1.3, The Print Requests Presentation.

3.3.1.4 Save/Restore Spooler Configuration

Save/Restore Spooler Configuration provides functions to save or restore printer configuration, Figure 3-18. Printer configuration is automatically saved whenever the printer configuration is changed using the Printer Configuration tool. If the current configuration is corrupted for some reason, you can restore the correct printer configuration using the Save/Restore Spooler Configuration functions.

To display the Save/Restore Spooler Configuration presentation, choose **Save/Restore Spooler Configuration** from the **List** menu



Time Saved: 05/25/97 at 09:03 Saved Default Destination: /var/sam/lp/de

Save/Restore Spooler Configuration 0 of 4 selected

```
Name       Type      Location
Printer1   remote    ps1a on Printer-IP-address
Printer2   remote    ps2a on Printer-IP-address
Printer3   local     /dev/c2t0d0_lp
Printer4   local     /dev/c1p0_lp
```

Figure 3-18. Printer Configuration Main Window (Save/Restore Spooler Configuration)

The Object List is a list of the printers configured in the station when the last snapshot was taken. The date and time when the last snapshot was made is shown in the Status Area. You can scroll through the list vertically or horizontally as necessary. A subset of the attributes shown in the Printers List is presented. The subset includes the attributes Name, Type and Location.

How to Save the Spooler Configuration

This function saves the current printer configuration. To save the spooler configuration, choose **Save Spooler Configuration** from the **Actions** menu.

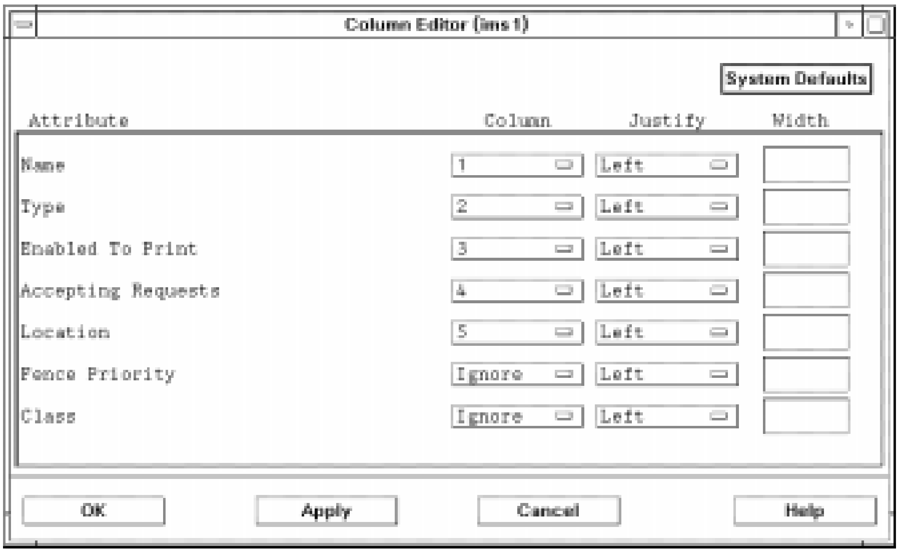
How to Restore the Spooler Configuration

This function restores the printer configuration from the configuration defined by Save/Restore Spooler Configuration. This operation has a destructive effect on any pending print job. To restore the spooler configuration, choose **Restore Spooler Configuration** from the **Actions** menu.

3.3.1.5 Manipulating the Presentation

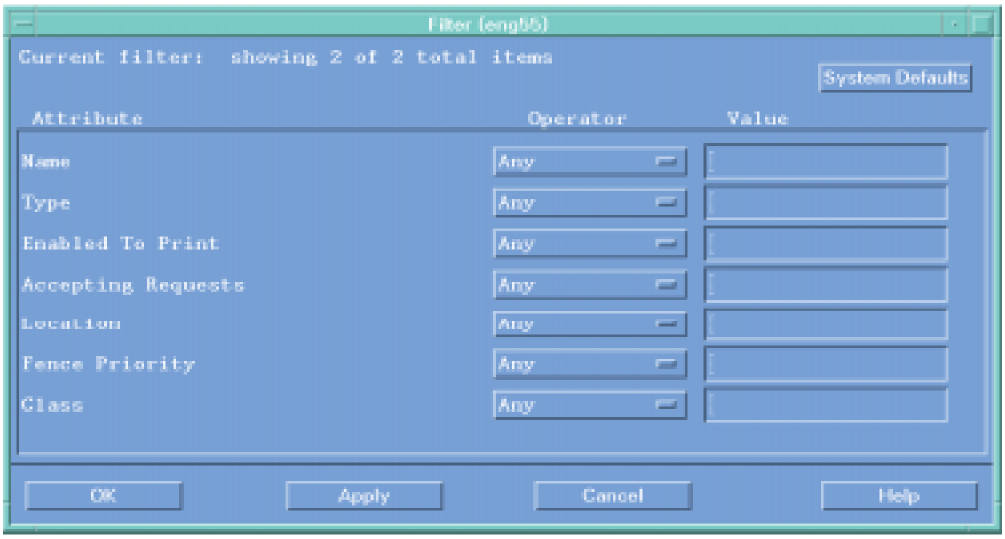
For all three presentations (Printer and Plotters, Printer Requests, and Save/Restore Spooler Configuration), the **View** and **Options** menus provide functions for manipulating the presentation. A brief description is provided below:

View - Columns	Rearrange the order of the columns in the Object List via a dialog box such as the one shown in Figure 3-19.
View - Filter	View a subset of the Object List based on specified criteria. Specify the subset via the dialog shown in Figure 3-20.
View - Sort	Sort the objects in the Object List based on specified criteria. You specify the sorting criteria via the dialog shown in Figure 3-21.
Save View as Default	Save the current Column, Filter and Sort settings for the Object List.
Options - Refresh List	Update the list of configured printer queues.



Attribute	Column	Justify	Width
Name	1	Left	
Type	2	Left	
Enabled To Print	3	Left	
Accepting Requests	4	Left	
Location	5	Left	
Fence Priority	Ignore	Left	
Class	Ignore	Left	

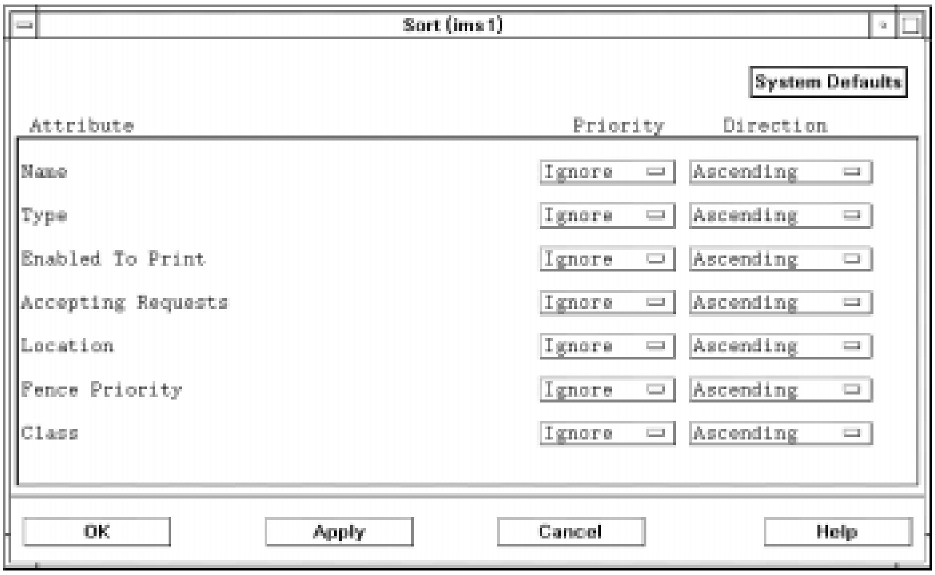
Figure 3-19. Column Editor Dialog Box (Printers and Plotters)



Current filter: showing 2 of 2 total items

Attribute	Operator	Value
Name	Any	
Type	Any	
Enabled To Print	Any	
Accepting Requests	Any	
Location	Any	
Fence Priority	Any	
Class	Any	

Figure 3-20. Filter Dialog Box (Printers and Plotters)



Attribute	Priority	Direction
Name	Ignore	Ascending
Type	Ignore	Ascending
Enabled To Print	Ignore	Ascending
Accepting Requests	Ignore	Ascending
Location	Ignore	Ascending
Fence Priority	Ignore	Ascending
Class	Ignore	Ascending

Figure 3-21. Sort Dialog Box (Printers and Plotters)

3.3.1.6 How to Exit the Printer Configuration Window

Use **Exit** in the **File** menu to exit the printer configuration window, Figure 3-22.

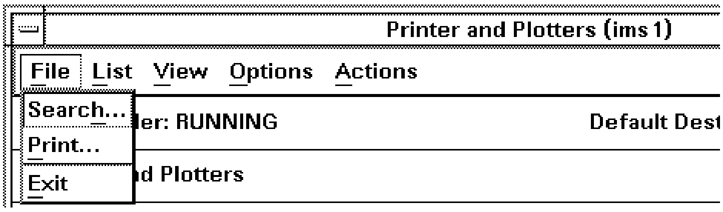


Figure 3-22. File Menu for Printer Configuration

3.3.2 Connecting a Printer to Serial or Parallel Port

A printer can be connected to an Advant Station node to support AdvaInform Reports and other AdvaInform applications. This printer must be capable of printing ASCII text. The connection can be made via either a serial or parallel interface. A parallel port is recommended since a limited number of serial ports are available and the serial ports are generally required for other devices.

There are two serial ports:

- The address for port A is 204
- The address for port B is 205.

One parallel port is available. The address is 206.

3.3.3 Connecting a TCP/IP Printer

To be able to use a printer located on TCP/IP (Network Based Printer), you need software in the operating system, which is not included by default.

Install the required software from the CD-ROM distribution according to the Printer manufacturer's instructions.

3.3.4 Disk Drive and SCSI device Setup

Install the first external disk drive at SCSI port 5 (or port 4 if you have 2 internal disks).

CAUTION

Do not connect or disconnect any SCSI device while the system is running, or turn power on or off to any SCSI device while it is connected to a powered-up system. Do not add or remove SCSI devices while the system is powered on. Doing so could result in data corruption or a system panic, which in turn could lead to corruption of the file system.

If you need to change the bus address for a SCSI device, be sure to perform the task in the following sequence:

1. Power down the Advant Station as described in the applicable *Advant Station 5xx Hardware User's Guide*.
2. Turn off the SCSI device.
3. Change the SCSI device bus address.
4. Turn on the SCSI device. Turn on power to all SCSI peripherals and make sure they have time to complete their self-test before powering on the Advant Station System Unit.
5. Reconnect the power cord to the Advant Station System Unit.
6. Start up the Advant Station as described in Section 2.2, Start-up Procedures.

Follow the *HP Disk Drive Installation Guide* to install additional disk drives.

3.3.5 How to connect the CD-ROM reader

If your CD-ROM reader is removable you must check that the SCSI address of your CD-ROM reader is set to 2. The address is set using the selector on the rear side of the drive. Also check that the CD-ROM reader is connected to the Advant Station SCSI port. It is recommended that use SCSI address 2 for CD-ROM and SCSI address 3 for DAT.

NOTE

Power to the IMS must be off when you connect the CD-ROM reader.

3.3.6 DAT Set-up and Compression

To install the DAT drive at SCSI port 3:

1. Make sure power to the Advant Station is OFF when you connect the CD-ROM reader.
2. Check that the SCSI address of your DAT drive is set to 3. The address is set using the selector on the rear side of the drive.
3. Check that the DAT drive is connected to the Advant Station SCSI port.

Most DAT tapes can handle data compression. By default the compressed device `/dev/rmt/0m` is selected. If your tape device does not support compression use the device `/dev/rmt/0mDDS1` instead. This decreases the amount of data you can store on the tape.

3.3.7 CD-ROM Reader Set-up

To install the CD-ROM reader at SCSI port 2:

1. Make sure power to the Advant Station is OFF when you connect the CD-ROM Reader.
2. Check that the SCSI address of your CD-ROM reader is set to 2. The address is set using the selector on the rear side of the drive.
3. Check that the CD-ROM reader is connected to the Advant Station SCSI port.

3.4 Tuning the Oracle Database

If the default setting of the Oracle database parameters is not sufficient for your needs, contact ABB for instructions on how to change them. One such case could be that you have performance problems related to the Oracle database.

3.5 Uninterruptible Power Supply - UPS

The Uninterruptible Power Supply functionality consists of the UPS hardware described in the *Advant Station 5xx*[1] *Hardware User's Guide* and a software portion installed according to Section 2.11, Uninterruptible Power Supply UPS.

3.5.1 UPS Functionality and Advant Station Shutdown on Battery Low

The UPS software supervises the UPS equipment. All UPS status changes are reported as event messages to AdvaCommand and as system messages to the Advant Station System Message Log. In addition the Advant Station is stopped (ordinary shutdown) when the UPS signals Battery Low. The shutdown results in shutdown messages to all open terminal windows requesting you and all other user's to log out as soon as possible. Furthermore the AdvaInform software and all application software supervised by AdvaInform are stopped and the Advant Station is halted.

3.5.2 UPS States and Corresponding Messages

The UPS reports the following states which result in actions and messages according toTable 3-3.

Table 3-3. UPS States

State	System Messages	Description	Action to take
OK	UPS_S_OK	OK: Normal power supply.	-
Battery	UPS_S_Battery	Battery: Main power is lost.	Check power supply to your UPS equipment
Battery Low	UPS_S_BatteryLow	Battery Low: Shut down as fast as possible.	The station will automatically be shut-down. You have approximately one hour before battery low.
UPS Off	UPS_S_Off	UPS is not working or no UPS connected.	Check your UPS equipment
UPS Not On Line	UPS_S_NotOnLine	Error: UPS is not On Line.	Check your installation
UPSProgram Error	UPS_S_ProgramError	Error: Access to UPS failed.	Contact ABB
UPS Line Error	UPS_S_LineError	Error: UPS device does not exist or failure to open the device.	Check your installation. Check that your UPS equipment is connected to the right tty device (tty0p0).

---

[1] 5xx stands for 515, 520, 520i, or 530.

3.6 Administration and Maintenance Functions

These functions are intended for system administrators only. Some are available via the **Settings** menu, which requires access at the category SYSTEM level. Other functions are executed from a command line in a terminal window.

3.6.1 How to Configure Control Network Parameters

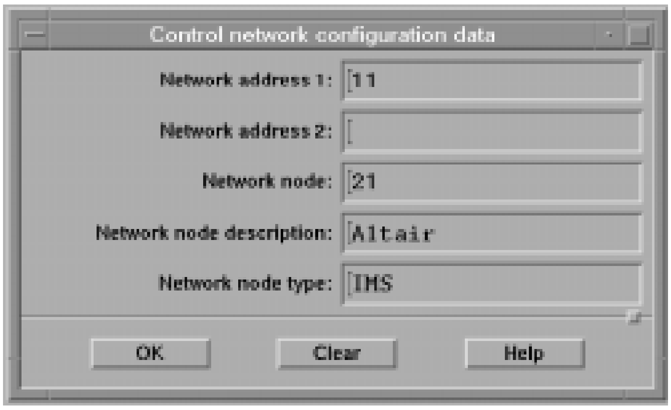
Configuration of control network parameters is generally done as a part of installation as described in Chapter 2, Installation. You can use the **Communication** menu item in the **Settings** menu to change network parameters. This menu item displays the Control network configuration dialog, Figure 3-23. There is a separate version for MOD 300 and Master.

NOTE

> All context files will be removed at next start-up of the Advant Station if network and/or node is changed.

Master: Any node that has retrieved data from the IMS node needs to resolve all those symbols again after the IMS is up again. (Use Object Reference Maintenance).

MOD 300: Any node that has retrieved data from the IMS node needs to be rebooted after the IMS is up again.



Network address 1: 11
Network address 2:
Network node: 21
Network node description: Altair
Network node type: IMS

Figure 3-23. Control network Configuration Dialog (Master Version)

The following configuration guidelines apply for systems with Master software. Configuration rules for nodes connected to control or plant networks, are provided in the *MasterNet User's Guide*. The section on connection of nodes to MB300 applies to IMS.
The following is a summary of configuration rules for MB300:

- Control network numbers can be 11-19, 21-29... 91-99.
- Node numbers on control networks can be 1-99.
- The maximum number of Advant Station OS and IMS per control network is 16.
- Plant network numbers can be 126-127.

- Node numbers on the plant network can be 10-99.

NOTE

If you connect the IMS to the Control Network, the MasterGate(s) has to be configured/opened to access other Control Networks or the Plant Network.

Master

The Communication window has the following fields

Network Address 1	For a redundant configuration this defines the first of the two available network addresses. The first one must always be defined. In the case of redundant networks Network Address 1 is used by default.
Network Address 2	This defines the second of the two available network addresses.The second address has to be defined in the case of redundant networks.
Network node	This specifies the node address
Network node description	This is the description on the IMS menu, Figure 3-24. Note: The IMS menu and System Status display, will not be updated before you start a new IMS menu. Current IMS menu will not be updated.
Network node type	This is the type of node. Click on **Help** button to display a list of valid choices. The only node type for an IMS node is IMS.

MOD 300

The Communication window has the following fields and push-buttons:

Network node	This is the network address for the IMS node (in decimal).
Network node description	This is a description that is displayed on the IMS Menu, Figure 3-24. It must be filled in.
Network node type	This is the type of node. The only node type for an IMS node is IMS.

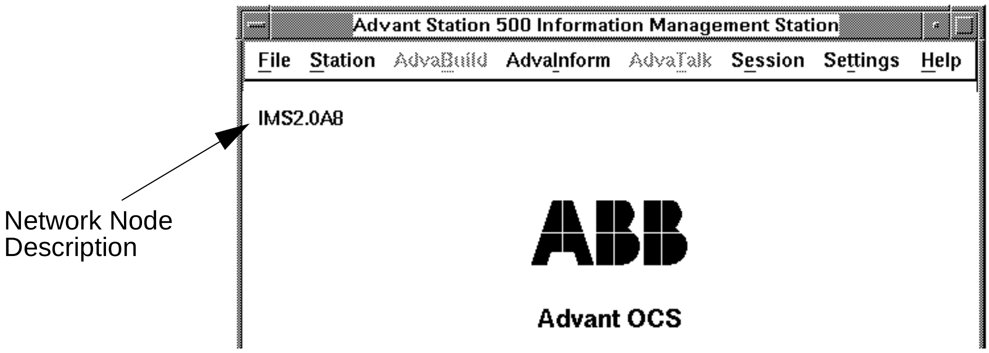


Figure 3-24. Network Node Description on IMS Menu

NOTE

To make changes in Control Network Parameters known to the system you have to restart the Advant Station.

3.6.2 How to Define and Manage Users

3.6.2.1 Introduction

Access to and the security of the AdvaInform software is determined by user authority. You log on to Advant Station as an operating system user. This user is either a predefined user such as ocsmgr or a user defined via User Definition. User authority is established by assigning a user to one of the categories listed in Table 3-4. Privileges are associated with each user category as indicated in Table 3-4. You can only access the functions that you are authorized for as described in Table 3-4.

Table 3-4. User Categories

Category	Oracle Role	Privileges
SYSTEM	IMS_SYSTEM_ROLE	Define, Configure, Operate, Opsyst
ENGINEER	IMS_ENGINEER_ROLE	Configure, Operate, Opsyst
OPERATOR	IMS_OPERATOR_ROLE	Operate

Table 3-5. User Privileges

Privilege	Description
Define	System administration functions such as setting the system time, setting up node numbers, and so on.
Configure	Configuration of object instances, history logs, report templates, and so on.
Operate	Operation of the AdvaInform runtime functions such as object presentation forms.
OPsyst	Provides access to the operating system through the terminal window accessed via the IMS menu.

Your home directory and environment are set up in the same way for all users belonging to the same category.

All IMS users have an Oracle account with the same name as the IMS user but with 'ops$' added as prefix. For example the IMS user **testop** has a Oracle account **ops$testop**. An Oracle OPS account automatically uses the operative system user name and password when connecting to Oracle, therefore no user name/password has to be given, for example:

```
$ sqlplus /
```

The Oracle user belongs to a certain role depending on the Advant user category. See Table 3-4 and Table 3-6.

Table 3-6. IMS roles

Oracle Role	Privileges
IMS_SYSTEM_ROLE	IMS_ENGINEER_ROLE CREATE USER ALTER USER DROP USER
IMS_ENGINEER_ROLE	IMS_OPERATOR_ROLE CREATE DATABASE LINK CREATE SYNONYM CREATE VIEW
IMS_OPERATOR_ROLE	CREATE SESSION ALTER SESSION

The IMS Users home directory and environment are set-up by default.

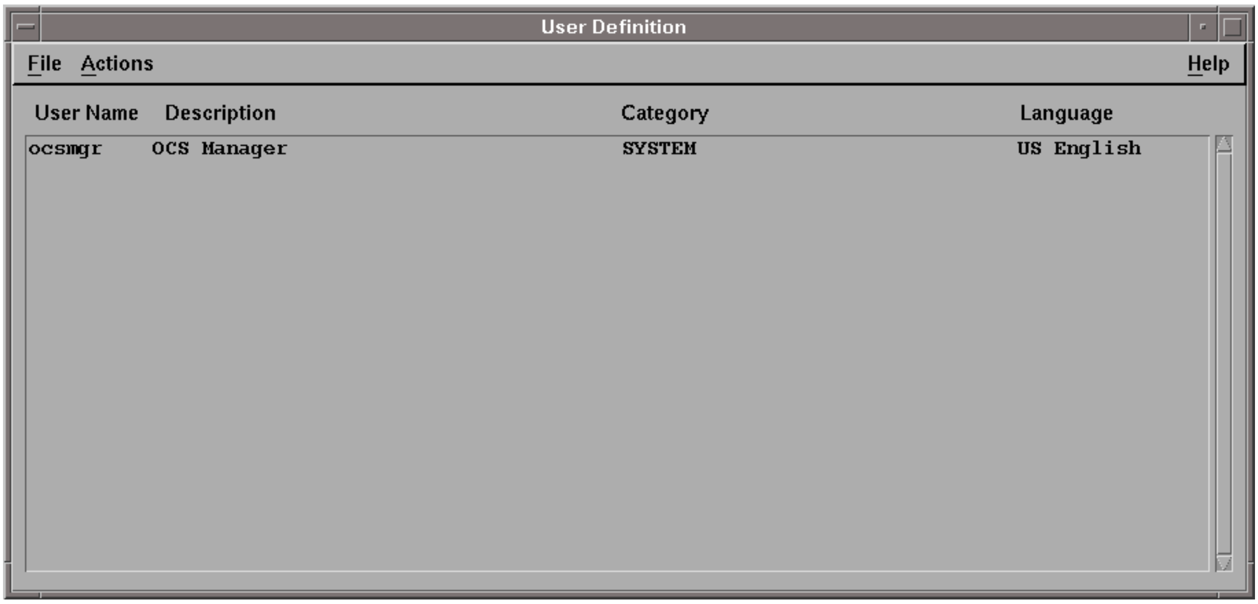
- Users have their home directory under `/home/`*`UserName/`*
- The AdvaInform environment is automatically set-up for all the categories.

3.6.2.2 User Definition Window

When you choose **User Definition** from the **Settings** menu, the User Definition window is opened, Figure 3-25. The User Definition window provides the means to create, modify and delete IMS Users. When you create a user you can define the default IMS category, access class, database user, password and language for the user.

NOTE

The ocsmgr user is the default system category user and cannot be removed or modified except for password or language preference.



User Name	Description	Category	Language
ocsmgr	OCS Manager	SYSTEM	US English

Figure 3-25. User Definition window

The menus in the User Definition window contain the following items:

File -	Exit	Exit the application.
Actions-	Create	Add a new user.
	Modify	Modify an existing user.
	Delete	Remove an user.

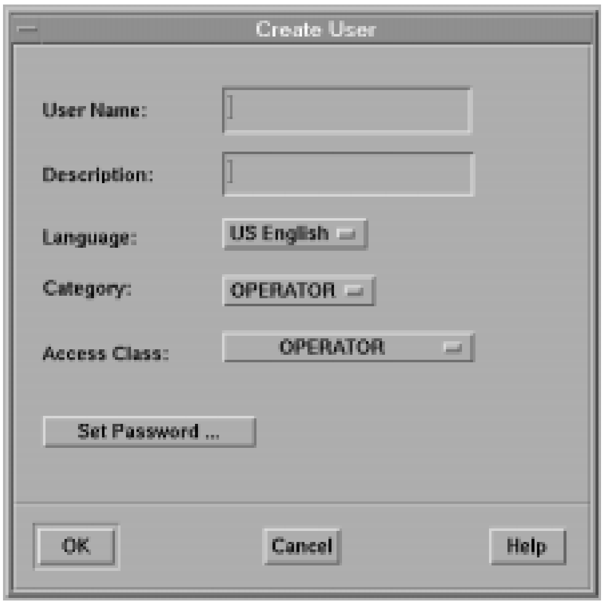
Help -	On Help	Information about the help facility.
	On Window	Information about the application window.
	On Keys	Information about the keys.
	Index	Shows the help index.
	On Version	Information about current versions.

The User Definition window contains the following fields:

User Name	Unique user name, case sensitive (3 - 8 characters)
Description	Text string (up to 42 characters) to further identify the user. This description is optional.
Category	Category determines the scope of functions that the user can perform. Three user categories are defined: **SYSTEM** (privileges = define, configure, operate, opsyst) This user category has access to all functions and system applications. A user **ocsmgr** of the category SYSTEM is always defined. Users of this user category: - manage the installed AdvaInform software - add and remove users of system, engineer and operator categories - redefine AdvaInform system variables such as mail and editor defaults. **ENGINEER** (privileges = configure, operate, opsyst) This user category is intended for engineers. Users of this user category: - configure object instances, history logs, report templates, etc. - operate the installed AdvaInform software. - have access to the operating system **OPERATOR** (privilege = operate) This user category is intended for operators. Users of this user category operate the installed AdvaInform software.
Access Class	This field is only applicable to systems with MOD 300 software. Access Class corresponds to the user access level assigned to individual operator displays via the Environment Builder or Console Configurator (for Multibus-based console.) A user must have the appropriate access class to access a given display.
Language	This is the default language for operator functions.

3.6.2.3 How to Create a User

To create a new user choose **Create** from the **Actions** menu on the User Definition window. This displays the Create User dialog box, Figure 3-26.



User Name:

Description:

Language: US English

Category: OPERATOR

Access Class: OPERATOR

Figure 3-26. Create User dialog box

The Create User dialog box has the following fields and push buttons:

User Name	Enter a unique user name. The name can be 3 to 8 characters and is case sensitive.
Description	A user description is optional. It can be up to 42 characters.
Language	Click on target in this field to display a list of available languages: US English, German and Swedish. Choose a language.
Category	Click on target in this field to display a list of categories: OPERATOR, ENGINEER, SYSTEM. Choose a category.

Access Class	Click on target in this field to display a list of access classes to choose from: ENGINEER and ENGINEER_NOLOG: User has access to all displays assigned ENGINEER, SUPERVISOR, and OPERATOR access class. SUPERVISOR and SUPERVISOR_NOLOG: User has access to all displays assigned SUPERVISOR and OPERATOR access class. OPERATOR and OPERATOR_NOLOG: User has access to all displays assigned OPERATOR access class. COMPUTER and COMPUTER_NOLOG: User has access to all PID and Auto/manual Control Loops whose computer mode is set to computer. NODEPS and NODEPS_NOLOG: User has access to all displays without having user authority checked. (This is equivalent to ENVIRONMENT user in Environment Builder.) Each of the access classes described above has a _NOLOG option (for example ENGINEER_NOLOG). When the _NOLOG option is selected, events associated with the applicable access class are not logged.
Set Password.	Click on the target in the Set Password field to set a password for the new user. When you click on this target, the Set Password dialog box, Figure 3-27, is displayed. The procedure for setting a password is described in Section 3.6.2.4, How to Set a Password. This step is optional. You are not required to set a password when you create new user. If you do not set a password, the default password (same as username) is used.
OK	Click on **OK** button to save your settings.
Cancel	To close the dialog box without saving your settings, click on **Cancel** button
Help	Click on **Help** button to get more information.

IMSCreateUser

Synopsis

```
usage:    /opt/advant/IMS/IMSCreateUser -n user name
           -s password [-v] [-?] [-d description] [-c category]
          [-p privilege level] [-a access class] [-l language]
```

Parameters

-v	Verbose mode.
-?	Gives a short help of the command.
-n *user name*	Name of the IMS user account.
-s *password*	Password for the IMS user account.
-c *description*	Description of the IMS user account
-c *category*	Category of IMS account (SYSTEM, ENGINEER or OPERATOR). Default is OPERATOR.
-p *privilege level*	OMF privilege level (omfLEVEL0 - omfLEVEL15). Default is omfLEVELE0. Not used today.
-a *access class*	OMF access class (omfENGINEER, omfENGINEER_NOLOG, omfSUPERVISOR, omfSUPERVISOR_NOLOG, omfOPERATOR, omfOPERATOR_NOLOG, omfCOMPUTER, omfCOMPUTER_NOLOG, omfNODEPS, omfNODEPS_NOLOG, omfCONTINOUS_CONTROL, omfCONFIGURATOR or omfSUPERUSER). Default is omfOPERATOR. This parameter is only of value for MOD 300 IMS.
-l *language*	Language to be used in IMS interface (AMERICAN, GERMAN or SWEDISH). Default is AMERICAN.

Description

The **IMSCreateUser** function creates a new IMS user account that have access to the IMS menu. It creates a home directory for the user, /home/*user name*. It will also create an Oracle account. This Oracle account will be an OPS account (OPS$*USERNAME*), that means the user only has to log in to HP-UX and then don't need any password for database access.

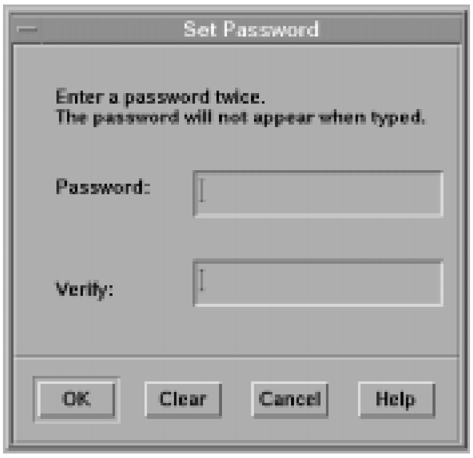
Example

This creates an IMS user account, kalle, with ENGINEER category privileges and the IMS menu will be in swedish. The Oracle user will be OPS$KALLE. The password will be kalle:

```
# /opt/advant/IMS/IMSCreateUser -n kalle -c ENGINEER -l SWEDISH

IMS user kalle is created.
```

3.6.2.4 How to Set a Password

To set a password for a new user, click on the target in the Set Password field. This displays the Set Password dialog box, Figure 3-27.



Set Password

Enter a password twice.
The password will not appear when typed.

Password:

Verify:

Figure 3-27. Set Password Dialog Box

The Set Password dialog box has the following fields and push buttons:

Password	Enter the password in this field.
Verify	Re-enter the password in this field to verify.
OK	Click on **OK** button to accept the password entry.
Clear	Click on **Clear** button to clear both input fields.
Cancel	Click on **Cancel** button to close the dialog box without accepting the entries.
Help	Click on **Help** button to get more information.

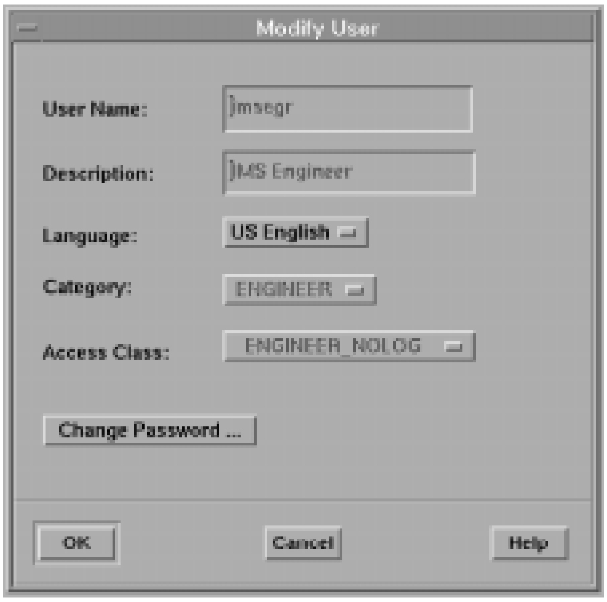
Enter the password and verify it, then click **OK** button. Passwords must meet the following requirements:

- Each password must have at least six and no more than eight characters.
- Characters must be from the 7-bit US ASCII character set; letters, digits from the English alphabet.

  For new users, the password defaults to the login name as long as the user name satisfies the password requirements and no password is set.

3.6.2.5 How to Modify an Existing User

To modify an existing user, choose **Modify** from the **Actions** menu, or double click on the user row. This displays the Modify User dialog box, Figure 3-28.



User Name: imsegr

Description: IMS Engineer

Language: US English

Category: ENGINEER

Access Class: ENGINEER_NOLOG

Figure 3-28. Modify User dialog box

This dialog box is identical to the Create User dialog box except that the User Name field is fixed and can not be changed.

IMSModifyUser

Synopsis

```
usage:    /opt/advant/IMS/IMSModifyUser -n user name
          [-s password] [-v] [-?] [-d description]
          [-c category] [-p privilege level] [-a access class]
          [-l language]
```

Parameters

-v	Verbose mode.
-?	Gives a short help of the command.
-n *user name*	New name of the IMS user account.
-s *password*	New password for the IMS user account.

-c *description*	New description of the IMS user account
-c *category*	New category of IMS account (SYSTEM, ENGINEER or OPERATOR).
-p *privilege level*	New OMF privilege level (omfLEVEL0 - omfLEVEL15).
-a *access class*	New OMF access class (omfENGINEER, omfENGINEER_NOLOG, omfSUPERVISOR, omfSUPERVISOR_NOLOG, omfOPERATOR, omfOPERATOR_NOLOG, omfCOMPUTER, omfCOMPUTER_NOLOG, omfNODEPS, omfNODEPS_NOLOG, omfCONTINOUS_CONTROL, omfCONFIGURATOR or omfSUPERUSER).
-l *language*	New language to be used in IMS interface (AMERICAN, GERMAN or SWEDISH).

Description

The **IMSModifyUser** function modifies an existing IMS user account. It only changes user parameters passed, other parameters will remain as before.

Example

This changes the privileges for the user kalle from ENGINEER category to SYSTEM category:

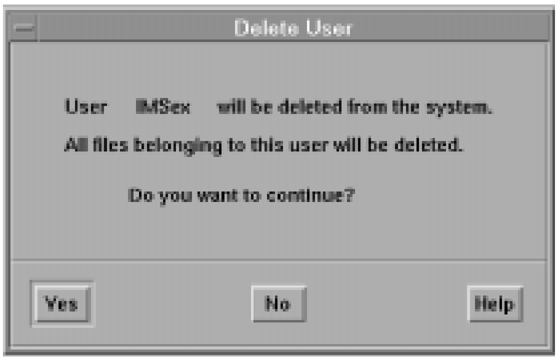
```
# /opt/advant/IMS/IMSModifyUser -n kalle -c SYSTEM
Modifing the following parameters for kalle:
Category ENGINEER -> SYSTEM.
IMS user kalle is modified.
#
```

3.6.2.6 How to Change a Password

This procedure is the same as for setting a new password as described in Section 3.6.2.4, How to Set a Password.

3.6.2.7 How to Delete a User

To delete a user, select a user in the User Definition window, and then choose **Delete** from the **Actions** menu. This displays the Delete User dialog box, Figure 3-29. Click on the **Yes** button to confirm the delete operation, or **No** button to cancel it.



User IMSex will be deleted from the system.
All files belonging to this user will be deleted.

Do you want to continue?

Figure 3-29. Delete User Dialog Box

The Delete User dialog box has the following push buttons:

Yes	Click **Yes** button to delete the user from the list.
No	Click **No** button if you don't want to delete the selected user.
Help	Click **Help** button if you need additional information.

IMSRemoveUser

IMSRemoveUser removes an existing IMS user account. It also deletes the Oracle account. It will remove the users home directory and all files in that directory as well.

```
usage:    /opt/advant/IMS/IMSRemoveUser -n user name [-v] [-?]
```

Parameters

-v	Verbose mode.
-?	Gives a short help of the command.
-n *user name*	Name of the IMS user account.

Example

Remove the kalle account:

```
# /opt/advant/IMS/IMSRemoveUser -n kalle
IMS user kalle is deleted.
#
```

3.6.3 Process Supervision

The AdvaInform software, including the applications you build, must be started and stopped in the right order to function properly. Therefore, when you build your own applications it is essential that you include them in the Advant Station start-up, shutdown and supervision.

Use the **Process Supervision** menu item in the **Settings** menu to specify how to include your Applications in the standard start-up, shutdown and supervision. Choosing this menu item opens the Process Supervision window, Figure 3-30.

Each process handled by AdvaInform process supervision must be assigned a unique number. Numbers between 1 - 8 999 and 99 001 - 99 999 are reserved for AdvaInform processes. Your applications can be assigned numbers from 9 000 up to 99 000. The number determines the start-up and shut down order with the lowest number first and the highest number last. When you plan the supervision of your applications you should give each process a start-up number with space above and below. This makes it possible to insert new applications between two older ones without having to change the start-up numbers of the older applications.

You can include all your applications from the start, even if all of them are not functioning yet. Simply use the corresponding radio button, and then re-start the IMS to include them when they are ready.

For each process, you can decide whether the process shall be restarted at failure or not. Vital processes should be restarted. You can also decide whether the application shall be locked into primary memory or be given a real time priority. If you do not have the knowledge to determine these factors you should consult HP UX documentation.

Your application can be started with 0 to 100 arguments passed on to it. The arguments are specified when you configure the supervision. The argument number specifies the order between the arguments. The argument numbers should be assigned with space between them to allow additional parameters to be inserted if such a requirement is expected.

Finally you can specify if your application shall be supervised by the system status functionality or not. You can group a number of application processes to be presented as one application in the system status display.

NOTES

- After configuring a process to be executed under supervision using the Process Supervision Tool, the process will be started the next time the IMS start-up is run.
- A process started up automatically by the IMS supervision is started and owned by the ocsmgr user.
- For a process to execute its directory path and file permissions must be set to be accessible by the ipa group and ocsmgr user.
- The Process Supervision Tool only supports the execution of one instance of a process. Each process to be monitored must be known by a unique process id or process name.

Example Process Supervision Record

In the example shown in Figure 3-30, all three start up parameters (In Service, Implemented, and Restartable) are selected so the process will start up at IMS start-up, and will be automatically restarted if the process terminates.

The process will be started without realtime priority since the Realtime Prio button is not selected. The process will not be locked in memory, nor will the predefined argument list be passed when it is started.

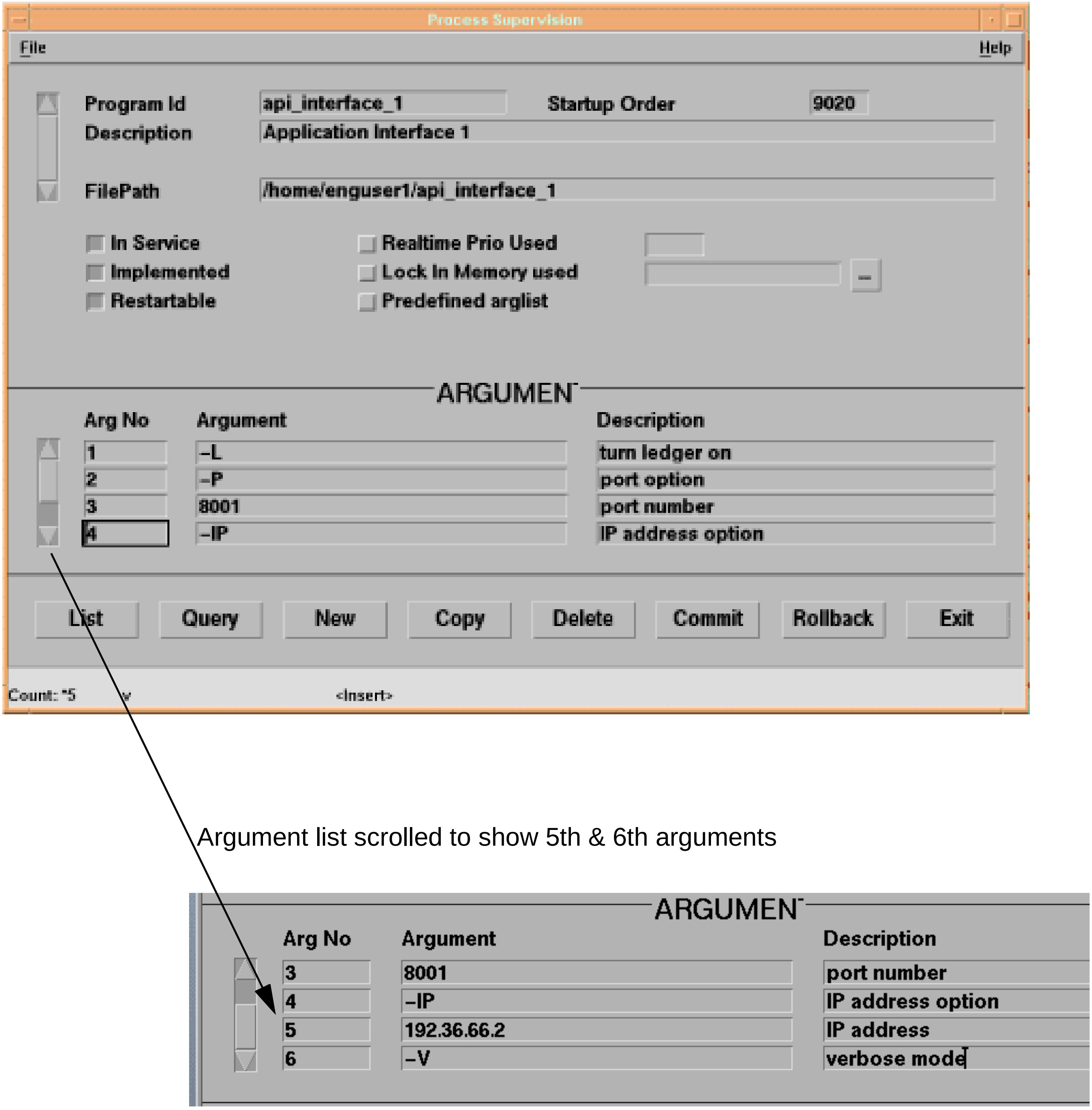
A user argument list with six arguments has been defined. Using this argument list, the process will be started by IMS supervision with the following command:

```
/home/enguser1/api_interface_1 -L -P 8001 -IP 192.36.66.2 -V
```

NOTE

When configuring arguments, the argument field does not allow spaces so options to processes which require additional parameters must all be entered as a separate argument. For example the port option "-P 8001" must be entered as two separate arguments.

Two additional examples are provided at the end of this section.



Program Id: api_interface_1
Startup Order: 9020
Description: Application Interface 1
FilePath: /home/enguser1/api_interface_1

☑ In Service
☑ Implemented
☑ Restartable
☐ Realtime Prio Used
☐ Lock In Memory used
☐ Predefined arglist

Arg No	Argument	Description
1	–L	turn ledger on
2	–P	port option
3	8001	port number
4	–IP	IP address option

Count: *5 v <Insert>

Argument list scrolled to show 5th & 6th arguments

Arg No	Argument	Description
3	8001	port number
4	–IP	IP address option
5	192.36.66.2	IP address
6	–V	verbose mode

Figure 3-30. Example Process Supervision Record

How to Set Up Process Supervision for a User Application

To configure process supervision for a user application, choose **Process Supervision** from the **Settings** menu, and then use the fields and buttons as described below to define a process supervision record for each process that you want to place under IMS supervision.

The Process Supervision window has the following fields and push buttons:

Program Id	Enter a unique Program ID for the process that you want to include under process supervision. This ID can be up to 51 characters. No spaces are permitted in the Program ID. The name must not contain any file path, just the name of the Process, which will be started using the FilePath below. The name you choose can be displayed in the System Status, Node Status display, if you select Supervision below.
Start-up Order	Enter a Startup Order value. Your applications can be assigned numbers from 9, 000 up to 99 000. **NOTE:** Numbers between 1 - 8 999 and 99 001 - 99 999 are reserved for AdvaInform processes. The number determines the order in which processes are started and shut down. The process with the lowest number is started (shut down) first and the process with the highest number is started (shut down) last. When you plan the supervision of your applications you should give each process a start-up number with space above and below. This makes it possible to insert new applications between two older ones without having to change the start-up numbers of the older applications.
Description	Enter a description. This field is optional. The description can be up to 251 characters
FilePath	Enter the complete path to an executable binary or shell script, with the filename included. The file path can be up to 251 characters maximum.
In Service	This button does not directly affect how the process will start up. Under most circumstances you should select this button when you want the process to start up at IMS start-up. This way the In Service button can serve as flag to indicate whether or not the process is running. If the process terminates for some reason, the system will automatically deselect this button. Thus, after the IMS has started, when you open the record for an existing process, if the process has terminated, you will see the In Service button deselected. If the process is running, you will see the In Service button selected (assuming you selected it when you originally configured process supervision for this process).

Implemented	Use this button to determine whether or not the process will be started at IMS start-up. When selected, the process will start up when the IMS is started. If this button is not selected, the process will not start under any circumstances. You may choose to not select Implemented when you want to configure process supervision for a process that is still under development. When the process is ready to be started, you can select Implemented and re-start the IMS.
Re-Startable	Select this button if you want the process to re-start automatically in the event that it is terminated. If this button is not selected, the process will only be started once when the IMS is started (if Implemented is selected).
Realtime Prio	If you want the process started with real time priority, select the **Realtime Prio** button and enter a priority number (0-127); otherwise the process is started with normal timesharing priority.
Lock In Memory	If you want the process to lock itself in memory, select the **Lock in Memory** button, and select one of the following options from the corresponding pull down menu: **PROCESS LOCK** - Lock the whole process in memory. **TEXT LOCK** - Lock only the text (code) part of the process in memory. **DATA LOCK** - Lock only the data part of the process in memory.
Predefined Arglist	If you want default arguments passed when starting the process, then select the **Predefined Arglist** button; otherwise only user defined arguments are passed. The predefined list contains the following arguments: <arg0>=FilePath value <arg1>= Lock in Memory value (-m) <arg2>= "warmstart" <argK>= Arguments
Arg No	The value in this field determines the order in which the arguments are passed to the process.
Argument	Enter one argument to the process in this field. No space permitted. 251 characters maximum.
Description	General comment. 251 characters maximum.

NOTE

The Process Supervision window provides space for 4 arguments initially. If you need to define more than 4 arguments, first click **Commit** to save your work up to this point, select that last argument (in this case Arg No 4), and then click **New**. This inserts a new argument line in the Process Supervision window and activates the scroll bar.

The pushbuttons in this window are described below:

Push Buttons	**Description**
List	This button displays a list of records for processes that you have defined via the Process Supervision window. Use this button to select an existing record for viewing and/or editing.
Query	This button is not used in the current implementation of this window.
New	This button has two functions. If the cursor is in the Argument list, clicking New inserts a new argument record below the current one. If the cursor is located anywhere else, clicking New creates a new blank process record.
Copy	Use copy to copy from the record above to the selected one.
Delete	If the cursor is in the Argument list, the selected argument record is deleted. Otherwise the process record is deleted.
Commit	Use commit to confirm the changes made since last commit. Use commit: - to save work periodically. - when you are finished editing a process record. - before you use the New button to create a new argument record. - after you use Delete to delete a record.
Rollback	Use Rollback to undo any changes since the latest Commit.
Exit	Use Exit to close the Process Supervision window.

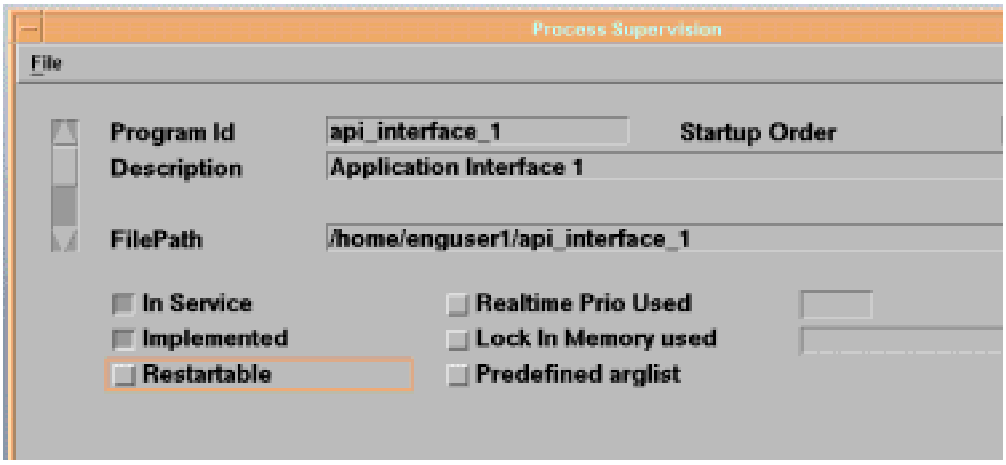
The menus in the Process Supervision window contain the following menu items:

File -	Exit	Exit the form.
Help -	Keys	Lists all available function keys.
	display Error	Shows last error from Oracle.

Additional Examples

Example 1 - Process to be started only at IMS start-up

In this case, only the In Service and Implemented buttons are selected, and the Restartable button is NOT selected, Figure 3-31. If the process terminates during execution, it will not be automatically restarted.



Program Id: api_interface_1
Startup Order:
Description: Application Interface 1
FilePath: /home/enguser1/api_interface_1

☑ In Service
☑ Implemented
☐ Restartable
☐ Realtime Prio Used
☐ Lock In Memory used
☐ Predefined arglist

Figure 3-31. Process Supervision Configured to Start Once at IMS Start Up

Example 2 - Using pre-defined argument list

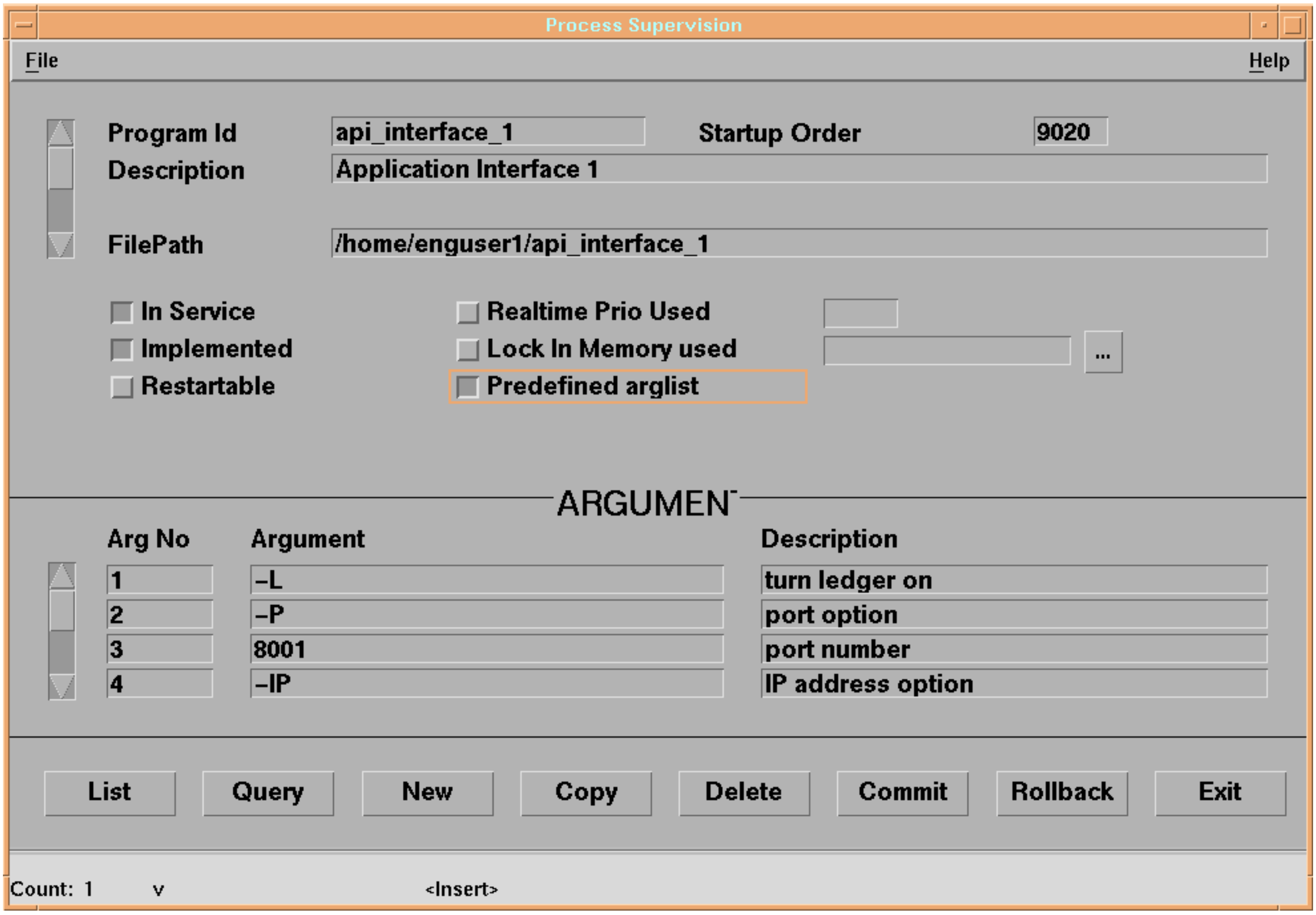
In this case, the process is invoked using both the pre-defined argument list, and user-defined arguments. The process will be started by IMS supervision with the following command:

```
/home/enguser1/api_interface_1 -m warmstart -L -P 8001 -IP
192.36.66.2 -V
```

where -m is the lock in memory value.

NOTE

If you select the Predefined Arglist button, the process must be set up to handle the additional arguments.



Program Id: api_interface_1
Startup Order: 9020
Description: Application Interface 1
FilePath: /home/enguser1/api_interface_1

☐ In Service
☐ Implemented
☐ Restartable
☐ Realtime Prio Used
☐ Lock In Memory used
☐ Predefined arglist

Arg No	Argument	Description
1	–L	turn ledger on
2	–P	port option
3	8001	port number
4	–IP	IP address option

Count: 1 v <Insert>

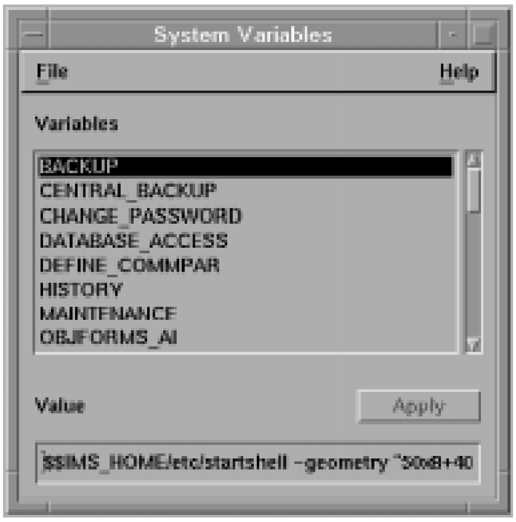
Figure 3-32. Process Supervision using Pre-defined Argument List

3.6.4 System Variables

A System Variable defines which commands to execute when you choose a menu item from the IMS Menu. The **System Variables** menu item provides the means to edit the system variables for a specific menu item. For instance, you can change the mail system or editor which is invoked when you choose the corresponding menu item in the **Station** menu. Generally, you should only edit system variables for the **Mail** and/or **Editor** menu items in the **Station** menu. It is strongly recommended that you DO NOT change system variables for any other menu items.

To change a system variable:

1. Choose **System Variables** from the **Settings** menu to open the System Variables dialog box, Figure 3-33.



BACKUP
CENTRAL_BACKUP
CHANGE_PASSWORD
DATABASE_ACCESS
DEFINE_COMMPAR
HISTORY
MAINTENANCE
OBJFORMS_AI

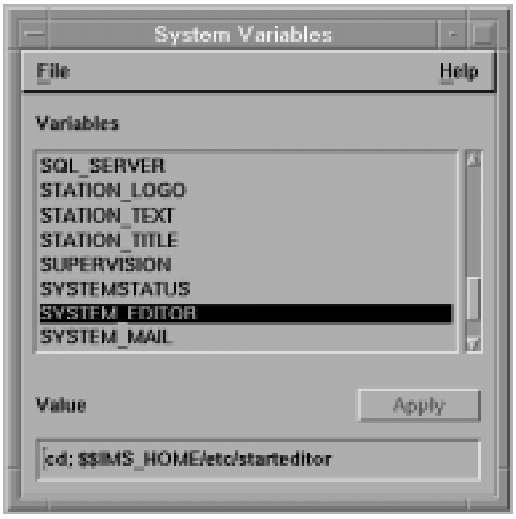
```
$IMS_HOME/etc/startshell -geometry "30x8+40
```

Figure 3-33. The System Variables dialog box

The System Variable dialog box has the following fields:

Variables	This box provides a list of system variables. Only the variables available for your category are listed.
Value	The value of the selected system variable, for example, a text string, a file reference or a system command. Formats and functions vary.

2. Scroll to the system variable that you want to edit and select it, Figure 3-34.



Value

`cd: $$IMS_HOME/etc/starteditor`

Figure 3-34. SYSTEM_EDITOR Variable selected

The corresponding value is displayed in the Value field.

CAUTION

When you define a system variable, be sure that the values you enter make sense and are compatible with AdvaInform. For instance, if you specify a new default editor, pay close attention to such parameters as foreground and background colors so that the editor is displayed in the manner that you expect it to be.

The System Variables dialog box menus contain the following items:

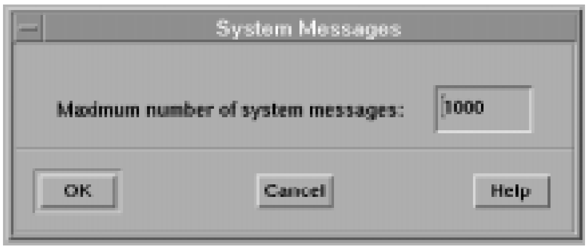
File -	New	Restore deleted system variables.
	Delete	Delete System variables.
	Exit	Close this window.
Help -	On Help	Information about the Help facility.
	On Window	Information about the application window.
	On Keys	Information about the keys.
	Index	Shows the help index.
	On Version	Information about current versions.

NOTE

Since you should never delete a system variable, you should not have to use either the **New** or **Delete** menu items.

3.6.5 System Messages

Choosing **System Messages** from the **Settings** menu displays the System Messages dialog, Figure 3-35. This dialog lets you specify how many system messages can be stored by AdvaInform. Normally, there is no need to dimension the system message.



Maximum number of system messages: 1000

Figure 3-35. The System Message window

The System Message window has the following field

Maximum number of system messages:	The maximum number of system messages to be saved in the database. The range is 200 to 10,000.

3.6.6 Real Time Accelerator Configuration (Master only)

This function is used to inspect and modify the Real Time Accelerator Board in the Advant Station. You must perform an Incremental Backup to save changes if you have modified RTA configurations.

3.6.7 Node Broker (Master only)

The Node Broker is a configuration tool to define the range of nodes outside your own network with which your station shall have contact. The Node Broker configuration is necessary to allow access (for example, subscription) towards nodes across gateway boundaries.
The Node Broker must be used for this purpose whether your station is connected to a control network or to the plant network. In both cases the configuration is done in exactly the same way.

Nodes can be added to or removed from a list of node entries. They can be connected or disconnected manually. Note that nodes in the control network can be added but the status of their node entries can not be manipulated. Optionally a node description can be added for each node entry.

Node entries are added with status “Down”. Initially each node must be connected manually. In this case the status will be changed to “Up”. No check is done if the node is reachable.

For nodes which are marked as “Up”, the actual communication status will be handled by applications in the same way as inside the local control network. This means that data to your applications will not be available when the subscribed node goes down and will be resubscribed if the node has been restarted. This change is reflected in the status indication for node entries in the Node Broker.

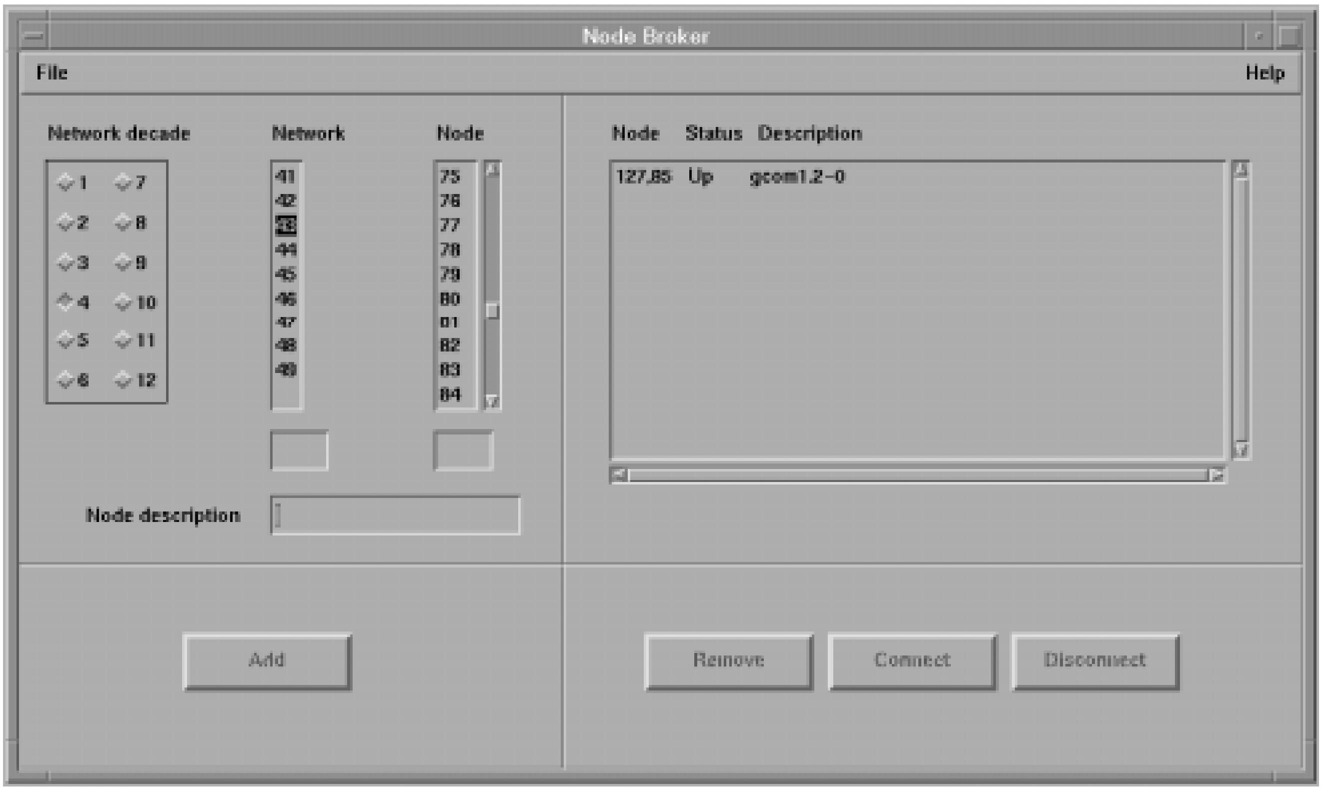
If one of the gateways goes down, all nodes for the corresponding control network are reported as disconnected. This change is not reflected in the status indication for the node entries in the Node Broker. All nodes marked with "Up" will be connected automatically after restart of the gateway. No other node entries will not be affected.

Node Broker information will be saved permanently and will be used at restart. Nodes indicated as "Up", will be automatically connected at restart of your station.

Starting Node Broker Configuration Display

The Node Broker Configuration Display is started from Settings - NodeBroker submenu

User Interface



Node	Status	Description
127.85	Up	gcom1.2-0

Figure 3-36. Node Broker Display

The User Interface is divided into a configuration and a presentation part.

In the configuration part you can add nodes outside the local control network which you want to access. A node description can be provided optionally.

The Presentation part provides a list of nodes already added with their corresponding network and node number, status and description. For the node entries in this list you can choose the following actions:

- Remove
- Connect
- Disconnect.

These actions are only available if an entry is selected. Only one selection is possible at a time. The Connect and Disconnect actions are dependent on the actual status. Connect is available when status is Down. Disconnect is available when status is Up.

No help is available yet.

The File menu contains the action “Exit”.

Short tutorial

The following example shows how to add and remove nodes, and change their status. This example also explains different situations which may occur.

To add a node (for example, node 4 in network 41), first choose the corresponding control network (Network decade). In this case it is 4. The network column will now allow you to choose between network number “41 ---49”. Click on “41” and select node number “4” in the Node column. The selected network and node number will be echoed in the fields below the corresponding column. Type the node description, for example IMS 1 nw 4, and press the **Add** key which is available after selection of both network and node number. The defined node will now be added to the list of node entries in the presentation part with status marked as “Down”.

The first time after configuration, the node has to be connected manually. Select node entry for “41,4” and press <**Connect**>. The status indication will change from “Down” to “Up”.

To verify the availability, you can do an access to an object using one of the Object Presentation Displays, for example, for AI. If you “Disconnect” the node entry a selection will not be possible.

Note that the gateway must allow selection. If the gateway does not allow selection, you have to build a display to verify the functions.

3.6.8 RTA Language (Master only)

The RTA language must be configured if you are creating objects with names containing national characters (åÅäöÖüÜß) and these objects are accessed from other nodes or if you are going to access objects in remote nodes with object names containing national characters.

The RTA language is configured with the script `IMSconfhawklang` located in the directory `/opt/advant/IMS/bin/`. You must be logged in as ocsmgr when executing this script. To configure the language of your choice use on of the following commands:

- american

  ```
  /opt/advant/IMS/bin/IMSconfhawklang american
  ```

- german

  ```
  /opt/advant/IMS/bin/IMSconfhawklang german
  ```

- swedish

  ```
  /opt/advant/IMS/bin/IMSconfhawklang swedish
  ```

After you have changed the RTA language the Advant Station must be restarted to make the newly configured language active.

3.6.9 MasterBus 300E (Master only)

To configure the communication protocol to MB300E, use the following command:

```
/opt/advant/IMS/bin/IMSconfcom
```

arguments:

`-e`: configure MB300E

`-n`: configure MB300

`-q`: show configuration

The configuration becomes active AFTER the Advant Station is re-started as described in Section 2.10, How to Re-start AdvaInform Software Manually.

3.6.10 MasterBus 200 (Master only)

To be able to subscribe on objects from a MB200 network, you have to set the Database Elements MB200A (CAB1.1), MB200B (CAB1.2), MB200C (CAB2.1) or MB200D (CAB2.2), property TRANSOFF to 0 in the transit node between MB300 and MB200. Local network numbers in the MB200 network is not allowed, it must be a network number within the control network. Read the *Process Station Database Elements User's Guide* for further information.

3.6.11 Time Synchronization and Time Setting

The date and time are continuously synchronized (once a minute) between the nodes in an Advant OCS network to assure that time stamped events from the different nodes have the correct relative time relations. All Advant Stations are by default configured to accept time synchronization messages. Those messages adjust the clock smoothly and incrementally (time adjustments are done in small steps, typically less than 1 second at a time).

All Advant Stations can synchronize the system time both in systems with Master software and MOD 300 software; however, the method differs in each case. See Section 3.6.11.1, Time Synchronization for Systems with Master Software - Normal and Section 3.6.11.4, Time Synchronization for Systems with MOD 300 Software.

Time synchronization also includes support for daylight saving. See Section 3.6.11.5, Daylight Saving.

It is also possible to sets the clock to a new time in one step. The new time is automatically distributed and synchronized to all nodes in the network. See Section 3.6.11.7, How to Set the Date and Time manually.

CAUTION

As soon as you have started History logging it is strongly recommended not to change the time. Time synchronization is of course OK but any time setting larger than 5 minutes will affect your History database.

3.6.11.1 Time Synchronization for Systems with Master Software - Normal

General functionality

The Advant OCS with Master software needs a Clock Master to be appointed as well as a Clock Master Backup. The Clock Master sends the system time to nodes on the control and plant networks when date and time are set and communication is established. The Advant Station Clock Master broadcasts time synchronization messages every minute to all nodes. The time synchronization accuracy is in the millisecond range. Conversely, Advant Stations can accept time synchronization messages from the Clock Master on the control or plant network (default for an Advant Station).

Details on how you can configure your Advant Station to be Clock Master or Backup clock Master, are given at the end of this section.

For details on Time synchronization and daylight saving in a Master system, see the *MasterNet User's Guide*.

A second node is assigned Clock Master Backup and will assume the Clock Master role if the currently active Clock Master fails. In addition to these two nodes, several other nodes may be configured to be capable of assuming the role of Clock Master or Clock Master Backup. This way, if the currently assigned Clock Master Backup fails, another Backup is selected from among the nodes that are configured to be Clock Master capable.

Each segment of the network can have its own Clock Master and a Clock Master Backup.

When the time is set from a node which is a possible Clock Master it will automatically assume the Clock Master role.

Rules for Time Synchronization and Configuration

The following are some important rules for time synchronization and configuration:

- At least two (2) nodes, residing in the same Network segment (having the same network number), must be configured to be potential Clock Masters. Thus, the active Clock Master and its Backup Clock Master will always exist in the same Network segment.
- Advant Stations coordinate Time Zone and Daylight Saving Time for all other nodes on the network. Thus the Advant Stations must reside in the same network segment (same network number) as the potential Clock Masters reside, and must be configured to be a potential Daylight Savings Time Masters.
- Manual setting of time can only be done from Advant Stations in the same network segment as where potential Clock Masters reside.

A detailed description of time synchronization for systems with Master software is provided in the *MasterNet User´s Guide*.

Table 3-7 lists the parameters for time synchronization.

Table 3-7. Clock Synch Database Element

	Item	**Values**	**Description**	
	CLK_MAST	TRUE	Can become clock master	Default IMS
		FALSE	Can not become clock master	
	LOC_TIME	0	Don't listen to any time telegram.	
		1	Listen to **Time Set Telegram**.	
		2	Listen to **Time Set Telegram** and **Time Synchronization Telegram**.	
		3	Listen to **Time Set Telegram** and **High Precision Time Synchronization Telegram**.	Default IMS
Node Connected to **Control Network**	CLK_SEND	0	Don't send any time telegram.	
		1,2 or 3	Send **Time Set Telegram** and **Time Synchronization Telegram**.	3=Default IMS
Node Connected to **Plant Network**	CLK_SEND	0 or 1	Don't send any time telegram.	
		2	Send **Time Set Telegram**.	Default IMS
		3	Send **Time Set Telegram** and **Time Synchronization Telegram**.	

Procedure to Configure the IMS Time Synchronization parameters

You can use the following utility to configure IMS clock synchronization.

- This command lets you configure other parameters in addition to clock master capability:

  `/opt/advant/IMS/bin/bcConfigClockSynch`

  arguments:

  [-uv] [-m 0|1] [-l 0|1|2|3] [-s 0|1|2|3]

  -u: print usage text

  -v: verbose mode

  -m: configure node as possible clock master (-m 1) or not (-m 0).

  -l: change the LOC_TIME property to 0,1,2 or 3

  -s: change the clock send property (CLK_SEND) to 0,1,2 or 3.

  See Table 3-7 for details on how to configure the database elements for clock synchronization.

NOTE

The IMS is configured to be possible clock master as default.

Corresponding Configuration of Mastergate 2xx/1

If the IMS is located on the Plant Network and you want the IMS to be clock master: Set the IMS RTA CLOCK_SYNCH database element property CLK_SEND = 3. The MasterGate 230/1 must also have the CLOCK_SYNCH database element configured in a certain way. MG CLK_SEND = 0, if you don't want to send clock synchronization to the Control Network, and CLK_SEND = 1, if you want to.

If the IMS is located on the Control Network and you want the IMS to be clock master: Set the IMS RTA CLOCK_SYNCH database element property CLK_SEND = 1. In this case the MasterGate 230/1 in your Control Network must have the CLOCK_SYNCH database element, property CLK_SEND =3 instead of 1.

For more information about clock synchronization between Plant and Control Network, refer to the *MasterGate 230/1 Technical Description*.

For details on Time synchronization and daylight saving in a Master system, see the *MasterNet User's Guide*.

3.6.11.2 Using an external source for Time Synchronization - Master

If you configure an Advant Station node to be a possible clock Master, as described in Section 3.6.11.1, Time Synchronization for Systems with Master Software - Normal, it will be able to assume the clock Master role. Normally the time is synchronized from the clock master nodes RTA clock (if it is and Advant Station). When an Advant Station is configured for reversed time synchronization the HP-UX clock will be time master.

The clock can be set in two different ways when you use Reversed Synchronization:

- Use the Date and Time setting function described in Section 3.6.11.7, How to Set the Date and Time manually.
- Call the AdvaInform User API routine bciSetLocalTime.

The later method is the one to use if you want to read an external clock through a software on the HP-UX workstation and then set the time in the Advant OCS system.

NOTE

The reversed time synchronization does not offer a clock master backup feature unless you have the synchronization software installed in another node and start it up if the Clock master node is down.

To set it up for reversed synchronization you have to change the configuration file /etc/opt/advant/UXBase/dxutsConfig by editing it as ocsmgr:

Change this line to:

```
REVERSED_SYNC_MODE = 1
```

You may also change the following line but 10 is the recommended frequency:

```
REVERSED_INTERVAL = 10
```

The maximum incremental change for reversed synchronization is 90 seconds. The time in the network will be incrementally synchronized according to the new time.

NOTE

When using reversed synchronization, no other node should become clockmaster. If this would happen, the clockmaster node and the reversed synchronization node both will try to synchronize all nodes within the network.

3.6.11.3 Using an External Source for High Precision Synchronization - Master

You can connect an external time source to some nodes. This gives an accurate time base, which then improves the accuracy of the absolute time in the time stamps.

An external source providing a clock pulse once a minute can be connected to an Advant Controller. If the Advant Controller is properly configured it will then sends synchronization messages to all nodes in the network.

See the *MasterNet User´s Guide* and the applicable Advant Controller documentation for details.

NOTE

Time may not be set in any other way than by the **Settings - Date & Time** dialog since this will affect the system in an unpredictable way. Details are provided in Section 3.6.11.7, How to Set the Date and Time manually.

3.6.11.4 Time Synchronization for Systems with MOD 300 Software

The system time for each node on the DCN is initialized by the Master System Timekeeper when the node is booted. From that point on, the System State Executive (SSE) System Time Manager maintains the system time by broadcasting the system time every seven minutes to all nodal SSE timekeepers (that is, all DCN devices and sub-devices).

The Master System Timekeeper and its Backup are assigned when the time is set at any one of the following:

- Advant Station Information Management Station
- Advant Station Operator Station
- Advant Station Engineering Station
- MOD 300 Console Node
- MOD 300 Gateway Note

Controllers cannot become System Timekeepers. When a node becomes the Master System Timekeeper, it automatically assigns the next logical node address of a node that is on-line and available to become Master System Timekeeper as the Backup System Timekeeper. If the Master System Timekeeper fails, the Backup System Timekeeper becomes the Master and assigns a new Backup. Anytime a new Timekeeper is assigned (Master and Backup), an informational diagnostic message is logged in the Diagnostic Archive.

The Clock accuracy is +/- 1 sec. between nodes. The clock may lose up to eight seconds per day, system wide (0.01%).

3.6.11.5 Daylight Saving

The Daylight saving functionality of all Advant Stations is configured as part of the installation procedure. As most Advant Stations are pre-installed when they are delivered, the Daylight Saving functionality and the related Time Zone selection is already done.

Time synchronization also includes support for Daylight Saving. That is, when Daylight Saving occurs the new local time will also be distributed to all Advant Controllers. The Advant Stations will not be affected as Daylight Saving is just a local presentation of the time.

NOTE

The Daylight saving and Time Zone set-up must be identical for all Advant Stations in your system. If not, History logging, Trend presentation and other time related functions may be severely disturbed when the Daylight Saving time shifts occur. Check this as soon as you add any new Advant Station to your network.

3.6.11.6 Time Zone

Advant Stations have support for handling different Time Zones and Daylight Saving. The other nodes on the network, mainly Advant Controllers and Gateway nodes, maintain only one local time.

To take advantage of the Time Zone support in the Advant Stations, the Controller and Gateway nodes may be configured to distribute updates of the local time. In this case one of the Advant Stations is appointed Daylight Saving Time Master. The local time is typically updated if the time zone is changed or if a Daylight Saving Time period begins or ends.

In order to maintain the correct local time in the network at all times, and have it follow the Daylight Saving shifts defined for the local Time Zone, all Advant Stations MUST be configured with the correct Time Zone information. (Generally, this applies for all nodes that support Time Zones). In the Advant Stations the current Time Zone is stored in the environment variable TZ. The TZ variable is automatically initialized with a pre-configured value at every start-up of the station, by reading the file `/etc/TIMEZONE.`

The Time Zone must be configured when the Advant Station is installed. This is part of the normal installation procedure as described in Chapter 2, Installation. The configured Time Zone information is then stored in the file `/etc/TIMEZONE` and should never be changed again. The one exception to this rule is if the Advant Station is delivered pre-configured from the factory, with the TZ variable defaulted in a way that is not appropriate for the final installation (for instance if the ordering information is wrong or incomplete). In this case, modify the time zone definition as described below before you connect it to your network.

To change the time zone configuration:

1. Disconnect the Advant Station from the Control Network.
2. Log in as root user.
3. Enter the following command:

```
$/sbin/set_parms timezone
```

4. Then follow the instructions in the graphical dialog.
5. Reboot the Advant Station.

3.6.11.7 How to Set the Date and Time manually

Use the **Date&Time** menu item in the **Settings** menu to change the date and time.

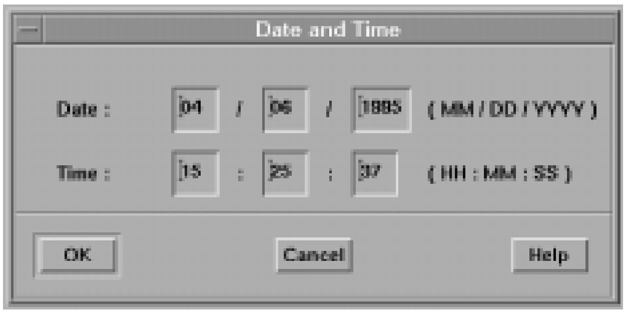
NOTE

For normal synchronization, see Section 3.6.11.1, Time Synchronization for Systems with Master Software - Normal and the RTA is configured to be able to be clock master as described in the same section, setting the date and time will establish the IMS as clock master and send clock synchronization message cyclically to all known Advant OCS nodes.

CAUTION

Changing the time more than incrementally (a few seconds, maximum five minute) should be avoided as time changes affect the reliability of the History logs. If your requirements on time accuracy and synchronization are high you should use an Advant Controller connected to an external pulse as time synchronization method.

Choose **Date&Time** to display the Date & Time dialog box, Figure 3-37. The current date and time are shown by default. The window is not dynamically updated. New date and time values can be entered in their respective fields.



Date : 04 / 06 / 1995 (MM / DD / YYYY)

Time : 15 : 25 : 37 (HH : MM : SS)

Figure 3-37. The Date & Time dialog box

The Date & Time dialog box has the following fields:

Date	Enter the date as month/day/year. Use two characters for month and day, and four characters for year. For example, Figure 3-37 shows the 6th day of the 4th month of 1995.
Time	Enter the time as hours/minutes/seconds. Use two characters for each. For example, in Figure 3-37 the time is15:25:37.

3.6.12 How to set-up Mail

The mail functionality in HP-UX 10.20 requires some configuration if the you want to send mail outside the local node, not using Name server (DNS). The configuration files for sendmail are located in directory `/etc/mail.`

1. You must modify the file `/etc/mail/service.switch` file. Change the line

```
hosts   dns       files
```

to

```
hosts   files
```

2. The file /etc/mail/sendmail.cw must contain all possible names for the local machine. For example

```
localhost
mynodename
mynodename.town.company.cmp.se
```

To change this file you have to be logged in as root and you have to change the protection of the file prior to the editing.

3. The file `/etc/mail/sendmail.cf` must be changed like this:

Use your favorite editor and change the line

```
#Dj$w.Foo.COM
```

to include the domain name of your machine:

```
Dj$w.town.company.cmp.se
```

Then remove the # (comment) on the following line:

```
#O ServiceSwitchFile=/etc/mail/service.switch
```

4. If you have made any changes to the file `/etc/mail/sendmail.cf` the sendmail router must be restarted. This is done by editing (as root):

```
/sbin/init.d/sendmail stop
```

```
/sbin/init.d/sendmail start
```

3.6.13 Memory Pool Utility (MOD 300 Only)

CAUTION

> The memory pool utility (`mputil`)is intended for ABB service personnel or customers with equivalent experience. The utility has no specific knowledge of how pools should be configured for the system to operate properly. If you use this utility to change memory pool allocations incorrectly, the Real Time Accelerator Board in the Advant Station may not start. If you need assistance, contact your field support representative.

The `mputil` lets you display and change the allocation of memory to the MTOS memory pools on the Real Time Accelerator Board (RTAB). Changes take effect the next time the RTAB or workstation is restarted. It works by modifying the MTOS memory pools table overlay file, `pu510_pools.x`. This is one of the files which is loaded into the RTAB during its start-up sequence. The most common use of mputil, is to enlarge the BACKMEM pool for large customer applications. CCF, TCL and DBMS are examples of system applications that use BACKMEM.

The program is menu driven. It is invoked from the shell command line in either a hpterm, or xterm window, but is best displayed in an xterm window. You must include the home directory, `$MODBASE_HOME/etc/Tools/ss`, in the $PATH environment variable, or use the absolute path of the program to run it. If you change the path variable, Enter: **`mputil`** to run it.

To change allocations, you must have write permission for the `pu510_pools.x` file in the `$PU510LOAD` directory. Also, you must know how much RAM is on the RTAB because the utility will prompt you for it. The System Status page on the OS, is one source of this information.

When you run `mputil`, the following menu is displayed, Figure 3-38.

```
Memory Pool Allocation Utility  Ver 1.1
                  D:  Current (default) PU510 Node Configuration
                  I:  IMS Node Configuration
                  O:  Operator Station Node Configuration
                  E:  Engineering Station Node Configuration
                  Q:  Quit
                  Select one :
```

Figure 3-38. mputil Menu

Select **`D`** for default. Enter the amount of RTAB memory at the next prompt. The current/custom memory configuration, and the original default configuration, are displayed. You can modify the custom configurations. The default configuration is saved to the file `pu510_pools.default` the first time the utility is run. Changes to the custom file will not be made until you save them. Therefore, you are allowed to experiment until the right configuration is achieved.

To save the custom pool values, select **S**. You will be given the opportunity to save the old pools overlay file to any filename. You must have write permission in the `$PU510LOAD` directory. The new changes are saved back to the `pu510_pools.x` file, which is the file loaded onto the RTAB.

CAUTION

> There are other files in the `$PU510LOAD` directory. Do not use any files that you have not created.

To change the amount of memory to configure on the RTAB, select **M**, then select either 1 or 2 for 8 or 16 Mbytes.

Figure 3-39 shows the main `mputil` display where memory allocation is done.

```
Node Type: ADVANT/Standard
 X-file directory: /opt/advant/MODPU510/load/
 Custom Pool: pu510_pools.x           Default Pool: pu510_pools.default
 End of Memory: $7FFFFF               Pool Memory: 5159 Kb
 Bit map start: $3a5300               Size: 34K
 Pool #         Pool Name        Custom Pools           Default Pools
 -------------------------------------------------------------------------
   0            FASTMEM           16%     708 K          16%    708 K
   1            LONGMEM           15%     664 K          15%    664 K
   2            DPLMEM            45%    1991 K          45%   1991 K
   3            BACKMEM          FIXED    700 K         FIXED   700 K
   4            HISTMEM            0%       0 K           0%      0 K
   5            CONSMEM            0%       0 K           0%      0 K
   6            OMFMEM            24%    1062 K          24%   1062 K
                                ----------------        ----------------
                        TOTAL    100%    5125 K         100%    5125 K
 -------------------------------------------------------------------------
                P : Enter POOL number and new percent
                R : RESET custom pool sizes to default sizes
                M : Change end of MEMORY address
                S : SAVE custom pool sizes
                Q : QUIT
                Pools file is not affected until changes are saved.
                 Select one :
```

Figure 3-39. mputil Main Display

3.6.14 Web server Netscape FastTrack

Though you have installed the Netscape FastTrack software it might not work correctly before configuration is done. You should configure the Netscape FastTrack server as described below.

1. Log in as root and start the administrator server with the command

```
# /opt/ns-fasttrack/start-admin
```

If the message “startup: listening to port 17482 as root” appears, the administrator server is started successfully.

2. Start the Netscape Navigator browser and open the location

   http://<hostname.domain>:17482

where <hostname.domain> is the name and domain of the system on which the administrator server is running and 17482 is the default port number used. When opening this location you will be prompted “root” user and password.

3. From the “Netscape Server Selector” page go to default - Content Mgmnt - Primary Document Directory and change primary directory to /home/opt/advant/
4. Exit from the Netscape Navigator browser. Stop the administrator server with the command

```
# /opt/ns-fasttrack/stop-admin
```

Chapter 4 Capacity and Performance

4.1 General

The performance and capacity data in this section are presented in a consistent manner to facilitate making comparisons, for example to compare different methods for data transfer. This consistent manner is described below:

- values/second (meaning attributes/second).
- all CPU load numbers/graphics describe how much the CPU load increases if the described case is applied.
- the examples use the Advant station AS520 (B132L) and in some cases AS530 (B180L).

The following performance tests are done on a Master system but the performance/capacity numbers are relevant for MOD 300 as well:

> AdvaInform User API, AdvaInform SQL*Connect, AdvaInform Object Handling, AdvaTalk Link to MATLAB.

Results from two performance tests based on typical configurations are described in Section 4.10, Typical Configurations. These configurations are for an Advant OCS with Master software; however, the data are still relevant for systems with MOD 300 software.

4.2 AdvaInform History

4.2.1 General

Disk space requirements:

Number of bytes/stored numeric log data point, Type 2: TTD - file based	4
Number of bytes/stored numeric log data point, Type 1: Standard - file based	24
Number of bytes/stored numeric log data point - Oracle	110
Number of bytes/message in a message log	250

4.2.2 Default disk and database space

By default, History allocates 200 MB disk for file based logs and 225 MB of database space for database storage. These default sizes provide space for approximately:

- 1000 logs
- 4,000,000 log entries
- 200,000 restored log entries

Capacity limitations Numeric Logs:

Total number of configured logs (primary plus secondary)	Dependent on machine type, memory. Practical limit 85,000
Maximum number of primary logs	Master (TTD): 8000 MOD 300: 4000
Number of entries per log (file based)	1,000,000
Number of entries per log (oracle based)	100,000
Total number of entries	100 Million
Number of logs in log group	1000
Number of logs in log set	1000
Number of logs in a composite log	16

The capacity is also limited by the Advant Station CPU performance which differs depending on the Advant Station hardware. For AdvaInform History, the most significant limiting factor is the data throughput from the Advant Controller 400 Series.

Table 4-1. Maximum capacity and CPU load formulas AdvaInform History

Function	Maximum capacity	CPU load formula % where x is # of entries/second
Numerical logging on AS530/C110 and AS530/B132L (TTD)	415 entries/second nominal	x * 0.033 - optimized with stagger x * 0.121 - without optimization
Numerical logging on AS515/100 (MOD 300):	330 entries/second	Not available
Sample Rate (if not limited by CPU power)	Master TTD: 300 entries/second nominal MOD 300 AS515/64: 100 entries/second MOD 300 AS530/C110: 165 entries/second	Not available
Maximum number of TTD requests over RTA per second	4.3 TTD requests per second	Not relevant
Numerical logging directly from local objects	250-300 values/second	Not available. Estimated to x * 0.20
Numerical user supplied logging through datasets and user application	350-400 values/second	x * 0.15

4.2.3 Numerical Logging using TTD (Master)

Figure 4-1 shows the CPU load added by History logging on the configuration described in Section 4.10.2, Typical Configuration 2 - Master. The History log sets are stopped prior to the test, and then started step by step.

The first step involves activating logging of local objects and some direct logging of objects in Advant Controllers. A total of 26 values are stored per second. The following steps involve TTD log collection and storage. About 95% of the entries per second come from the sampled data and 5% from secondary logs.

NOTE

The TTD logging in this machine is not optimized with the History stagger function. This makes a large difference in the performance and in the TTD throughput.

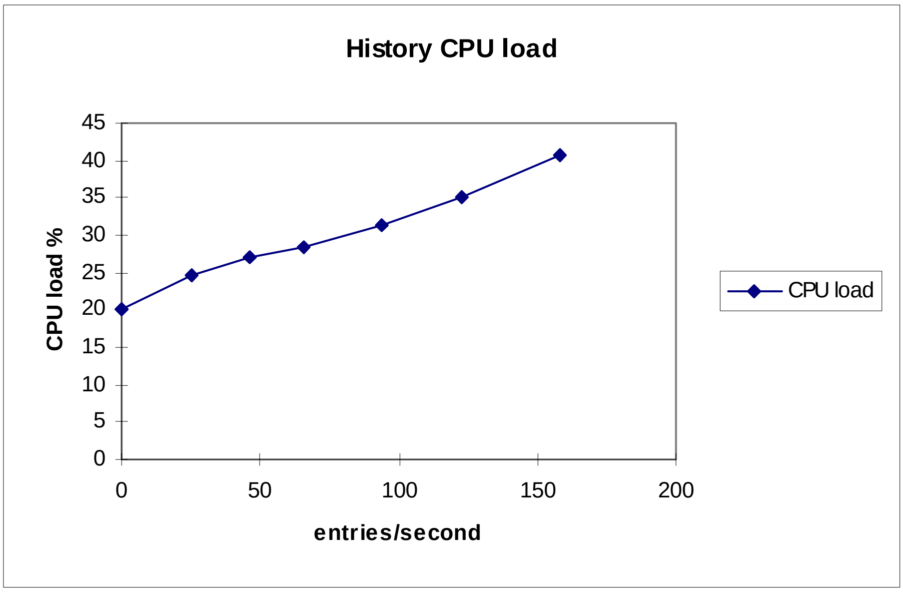


Figure 4-1. History CPU load in typical configuration 2

A typical CPU load from this test provides the following CPU load calculation algorithm:

CPU load = number of stored values per second * 0.121

Other tests run with an optimized TTD logging and other conditions provide the following algorithm:

CPU load AS530/C110 = number of stored values per second * 0.033

4.2.4 User Supplied Data Through Datasets (Master)

The new Dataset option is a fast and reliable data transfer method. Combined with the user supplied numerical logs and one or several User API programs, this method provides a good alternative to TTD logging. Figure 4-2 describes the CPU load related to the number of values collected and stored into History per second. Two graphs are shown, each one describe the different size of temporary buffering between writes to the User supplied log. The input comes from datasets with a one-second frequency. The fastest standard frequency for a dataset is 0.5 second. Thus, collecting 100 values for each log before doing the actual writes decreases the load on the system significantly compared with 10. Reasonable buffer sizes could be 30, 60 and 120 values.

The following are CPU load formulas where X is values / second:

- 100 value buffering: CPU load increase = 0.0834 * X%
- 10 value buffering: CPU load increase = 0.15 * X%

The upper limit for how many values can be collected and stored has not been measured, but the maximum dataset rate that has been tested is 480 values/second. That should result in a CPU load increase of 480x0.0834 = 40%.

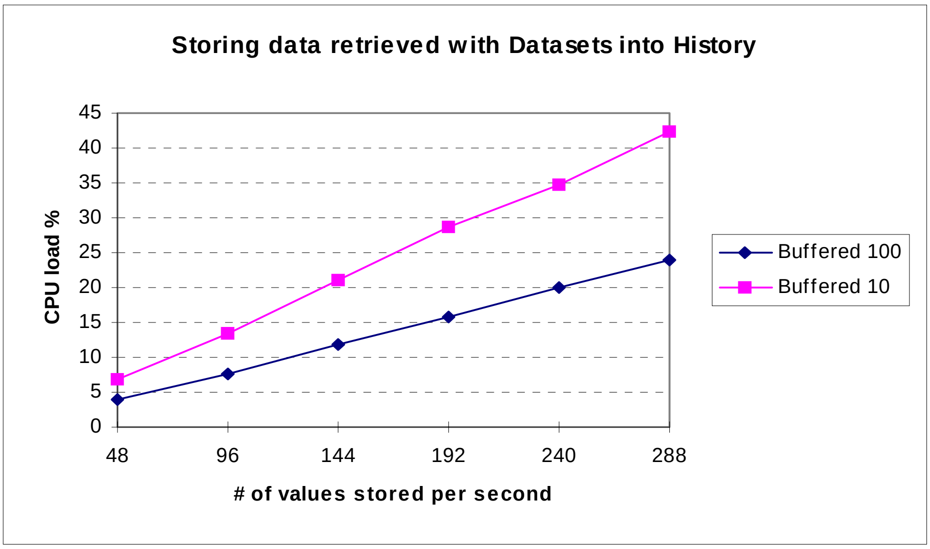


Figure 4-2. User supplied data through Datasets

4.3 AdvaInform Reports

Reports does not have any hard capacity or performance limitations. Complex reports with complex data retrieval statements (SQL queries) take much more time to execute than simple reports with simple, straight forward SQL queries.

4.4 AdvaInform User API

The User API does not use any disk. Therefore it is only dependent on primary memory and CPU power for performance.

The capacity limitations for data retrieval are described for the Do Request functionality. In general it is recommended to write all applications using Do Request for the best possible performance. Do Request is also recommended for most applications because it makes it much easier to build applications.

Do Request has the highest performance of the available methods for data retrieval, except when many objects are read at very fast cyclic intervals (1 or 2 seconds). The upper limit for the throughput is dependent on the number of attributes read in each request and the number of objects in each request. Figure 4-3 and Figure 4-4 provide more data to estimate the load and capacity of the User API.

CPU load = no of values read/second * 0.06	**Do Request**
CPU load = no of values read/second * 0.24	**Demand**

The graphs in Figure 4-3 and Figure 4-4 compare demand and Do Request and with regard to performance and throughput. The objects that are read are placed in a MP280 and in an AC450.

The first graph, Figure 4-3, shows the maximum number of attributes that can be read per second related to the size of each request. Two attributes are read per object. The best throughput is achieved with about 10 to 50 objects per request. The throughput decreases with larger request buffers.

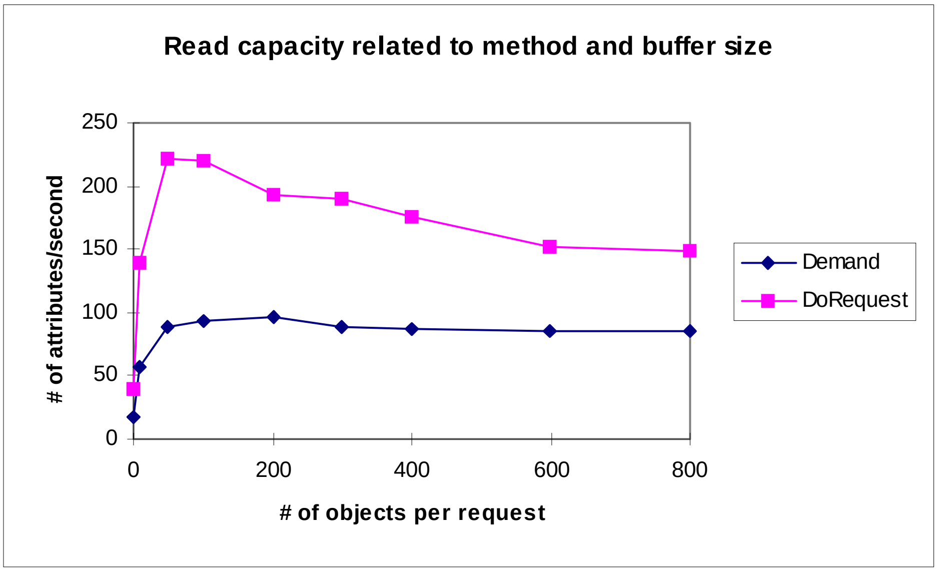


Figure 4-3. User API - read capacity related to size of request

The second graph, Figure 4-4, shows how many attributes can be read per second related to the number of attributes per object in the request. When the number of attributes per object is increased the throughput in attributes/second increases. This shows that performance is largely dependent on the number of requested objects.

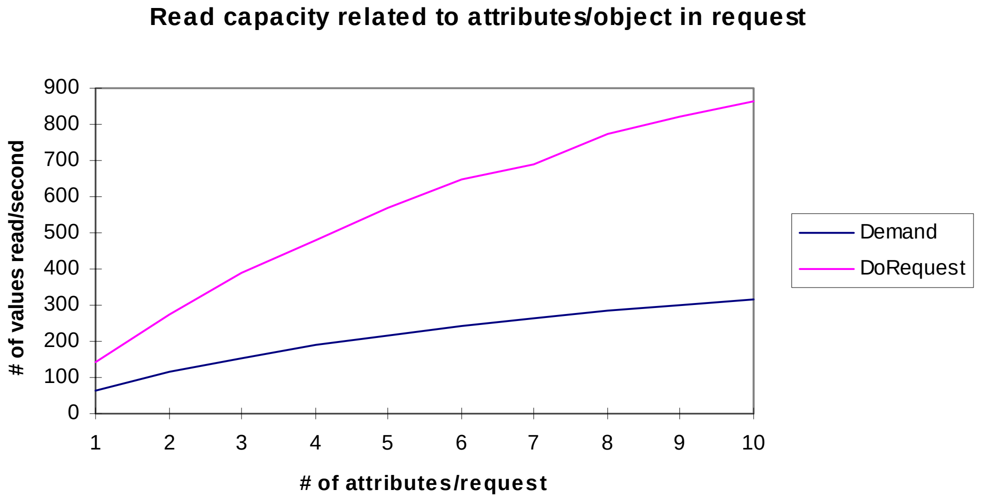


Figure 4-4. Read capacity related to number of attributes per object in request

Figure 4-5 shows the corresponding CPU load when the two different methods are used to read 50 objects at a time, two attributes each, as fast as possible.

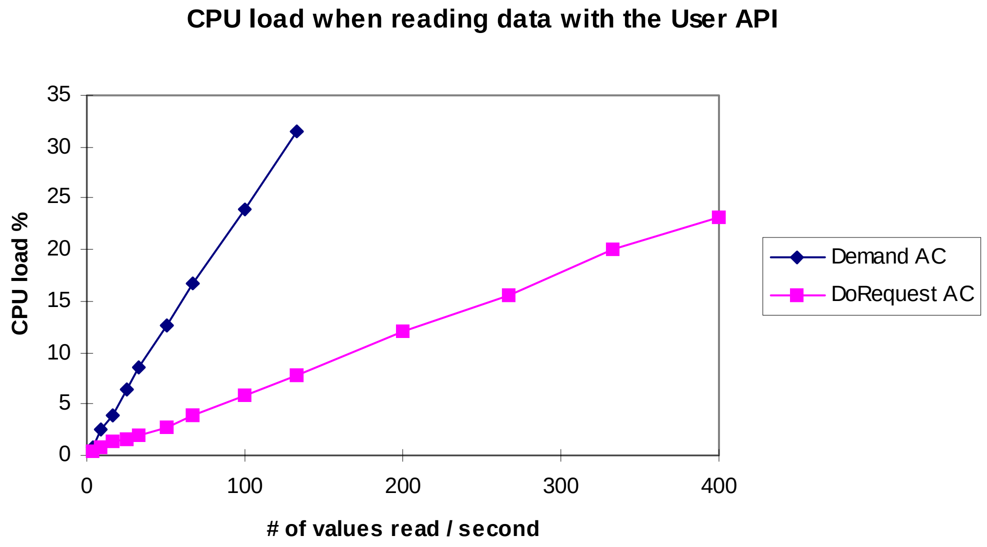


Figure 4-5. User API - Comparing CPU load for different access methods

Do Request is not recommended when sending execute operations. This is because operation parameters can not be changed when using Do Request. However, Do Request can be useful if you want to send identical operation requests (same parameters all the time) with high frequency. Simulation is one such example.

When you use API execute operations to update objects try to optimize the number of requests in one call to between 10 and 20 to get the best performance and least CPU load. For execute operations there is a slight difference when accessing an Advant Controller or a MasterPiece. The higher performance of the Advant Controller gives higher throughput.

When requesting for 10 or more execute operations at a time the upper limit is typically 60 to 80 operations per second. This also depends on the Advant Controllers load.

Figure 4-6 shows the throughput from a User API program on an AS530/C110 against a Master MP280 and a AC450 (the output is split between the two controllers).

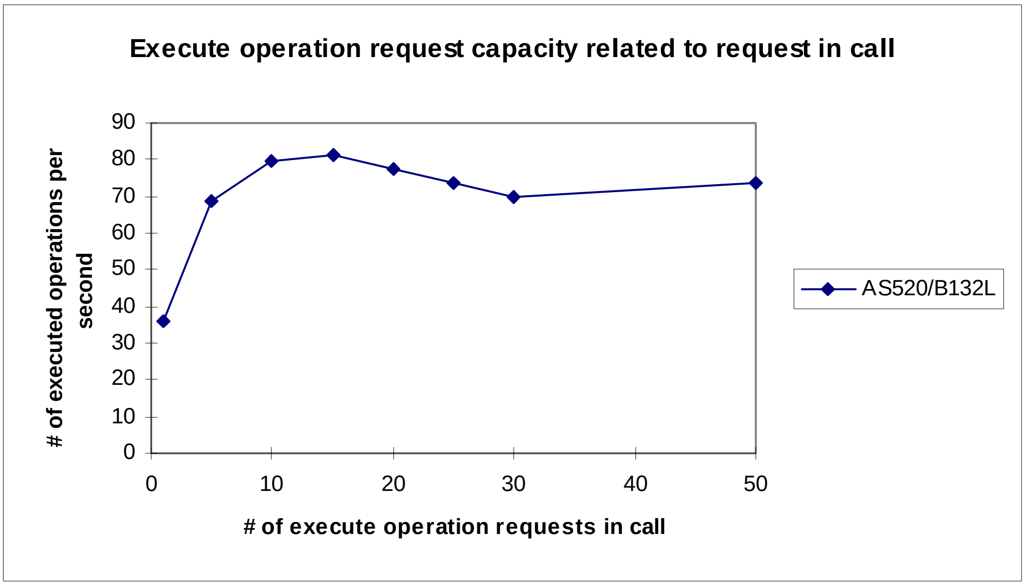


Figure 4-6. Performance execute operations - Master

4.5 AdvaInform SQL*Connect

4.5.1 AdvaInform SQL*Connect - Client

The performance of AdvaInform SQL*Connect client is to a large extent dependent on the SQL-application itself. It is important to write effective SQL statements, to use PL/SQL where possible and write time critical applications in Pro*C. The requesting application has the largest impact on performance!

The capacity of the SQL*Connect client, when reading data in large chunks (20-80 objects at a time) using Pro*C applications, requesting 2 attributes/object is: [1] 30 values/second (for AS520/B132L).

Figure 4-7 shows the CPU load caused by SQL*Connect client and all related processes when SQL*Connect is accessed by a Pro*C program asking for two attributes from 50 objects per reading, repeating this a number of times per second. The graph also shows the relation between AS520 and AS530 for an identical test.

---

[1] The figures describe accesses towards ordinary objects such as AI, DI, PIDCON. Accesses towards log objects are not predictable in the same way since history keeps time stamped values.

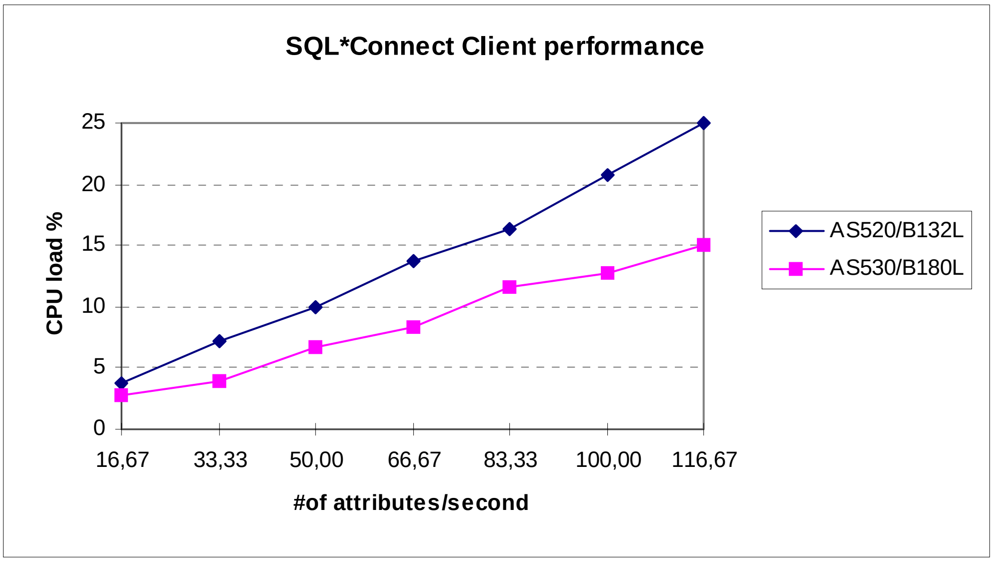


*Figure 4-7. SQL*Connect Client Performance*

4.5.2 SQL*Connect - Server

To test the performance of the SQL*Connect server, up to 300 AI objects in steps of 20 are subscribed upon with 9 seconds cyclicity from a User API program. Two attributes are read per object. The objects are handled by the SQL*Server so each object corresponds to a row in the DB_AI table which is connected to the AI object type. See Figure Figure 4-8.

As a rule of thumb the following capacity limitations should be followed:

> AS520/B132L 450 attributes with 9 seconds cyclic subscription
> (50 values/second)

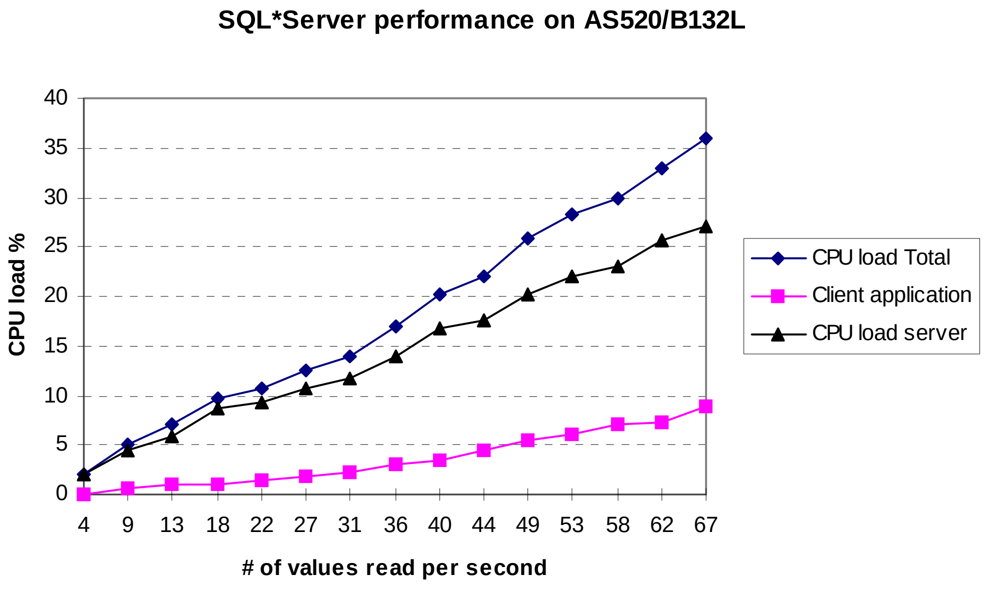


*Figure 4-8. SQL*Server - CPU load*

4.5.3 AdvaInform SQL*Connect Programming

SQL*Connect programming is not intended for high performance data transfer, but rather to make it convenient to do everything from SQL and PL/SQL, for example, using the Programmer 2000 - Pro*C compiler to integrate it into application programs.

The following upper capacity limits on the different data transfer methods should be considered. They are not in any way determined by the CPU load, but rather by the design of SQL*Connect programming. The maximum is between 5 and 25 objects per request:

For reading data, the maximum number of values per second are:

- Cyclically: 40
- On demand (one shot): 5
- Do Request: 40

The number of execute operations per second is 5.

Figure 4-9 shows the CPU load when reading data with Do Request.

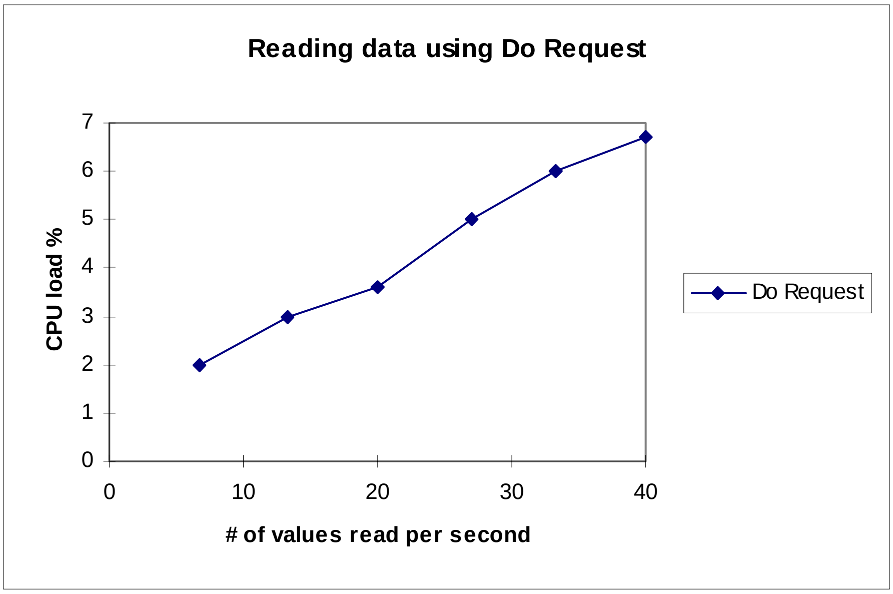


Figure 4-9. CPU load when reading data with Do Request

4.5.4 AdvaBuild Object Type Builder

The capacity of the AdvaBuild Object Type Builder is as follows:

- The number of attributes are limited to 254.
- The length of a string attribute is restricted to 256 characters.

4.5.5 AdvaInform Object Handling

The capacity limitations for AdvaInform Object handling are as follows:

- The lowest cyclic interval for objects is one second.
- A maximum of 8100 connections per object handler are allowed.
- A maximum of 15,000 Basic Objects without connections are supported without extensions of the HP-UX kernel.
- The total amount of single and object connections towards Advant Controllers is limited for Master. The total amount of connections from User Objects, Calculations, User API and History (using object logs from controllers) applications using permanent subscriptions are limited due to available dynamic memory on the RTA board. A maximum of approximately 7500 single connections using the normal subscription method can be active at the same time. If you use object connections the limitation is less then 7500. It is difficult to predict the exact amount of object connections as it depends on the size of the attributes included in each object connection.

See the *AdvaInform Object Handling User´s Guide* for information on how to use submit requests instead of subscriptions if you reach the upper limit.

The corresponding limitation on a MOD 300 depends on the number of available lists.

The following are recommendations for User Objects:

- If your application needs to read a lot of data per time unit, use large User Objects with many input connections. The data from the objects are packed more efficiently, and the load on the communications system is lower.
- If the results from your User Objects do not need to be stored permanently after each execution, turn off the Oracle shadowing for the object type. The CPU load for container objects, that is objects that are only used for storage of data, increases about 10 times with oracle shadowing active.
- If you have a lot of output from your object type, use the asynchronous buffered method if possible. Do not use synchronous output unless you really must synchronize with other objects.

Figure 4-10 shows the CPU load created by the Object Handling and the core system when a number of coBasicCalc object instances are executed. Each one is configured with 10 inputs (each execution results in the reading of one value each from 10 different objects). The coBasicCalc stores the result in its own VALUE attribute. A number of instances are executed with different execution intervals, and on a number of different Advant Stations. The input is read from Advant Controllers.

NOTE

The AS520 test is run on AdvaInform Object Handling 1.4-0 (HP-UX 10.2) and the others on the previous release 1.3.

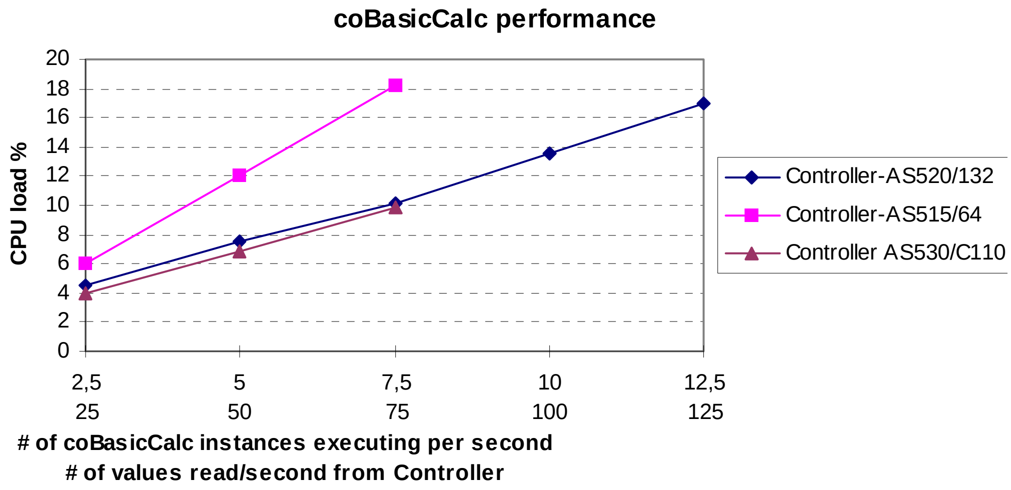


Figure 4-10. Object Handling - coBasicCalc CPU load in a Master system

When you execute 10 coBasicCalc instances per second, 100 values will be read per second from Advant Controllers and the CPU load will increase by at least 14%.

Figure 4-11 shows a similar measurement from instances of an application-specific object type with 50 inputs (each execution of an instance results in the reading of one attribute each from 50 different objects) executed in a Master system.

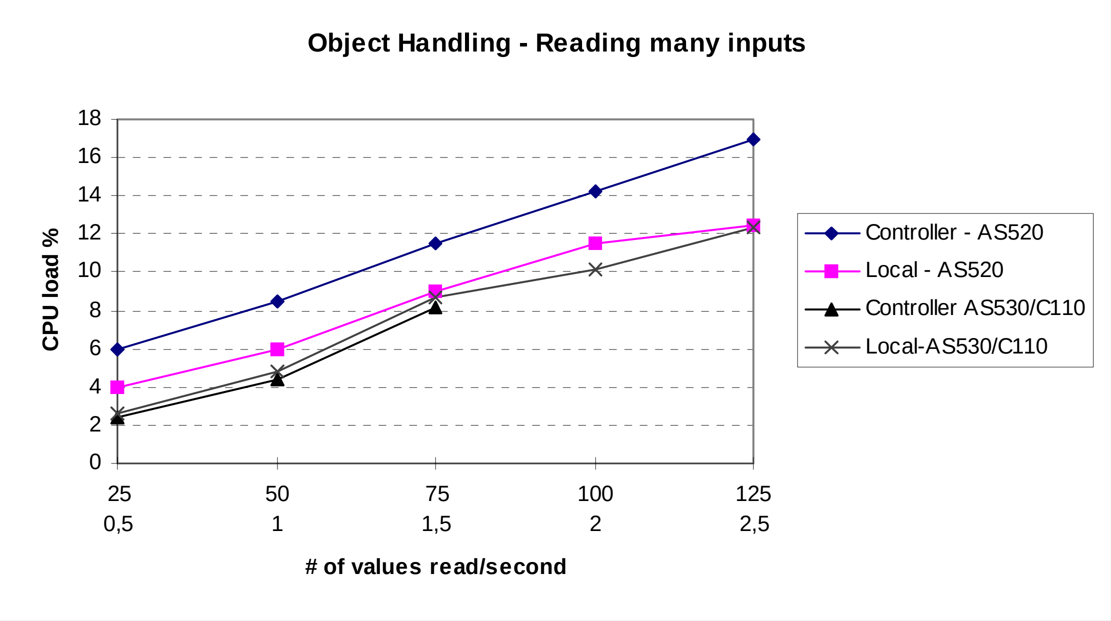


Figure 4-11. Performance when executing objects reading 50 inputs per object

Figure 4-12 shows the CPU load for executing operations in Advant Controller objects. This corresponds with updating those objects with new values.

The tests are done using the asynchronous buffered output from User Objects which send 30 or 10 updates for each execution. Test series are towards Advant Controller 4xx (Master).

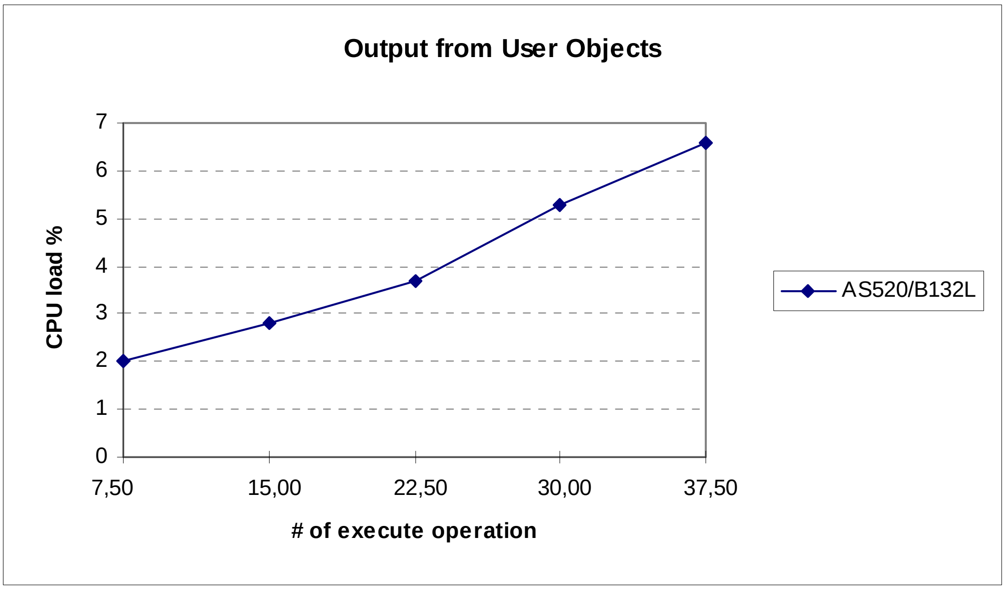


Figure 4-12. Object Handling - Performance executing Operations - Master

4.6 Dataset (Master)

All the dataset performance results are executed on an AS520 (B132L) machine.

4.6.1 Reading Data From Advant Controllers

Datasets are sent from Advant Controllers to receiving datasets in AdvaInform Object Handling and stored in local Basic Objects (DAT), Figure 4-13. Each dataset contains 24 DAT objects with the format Real.

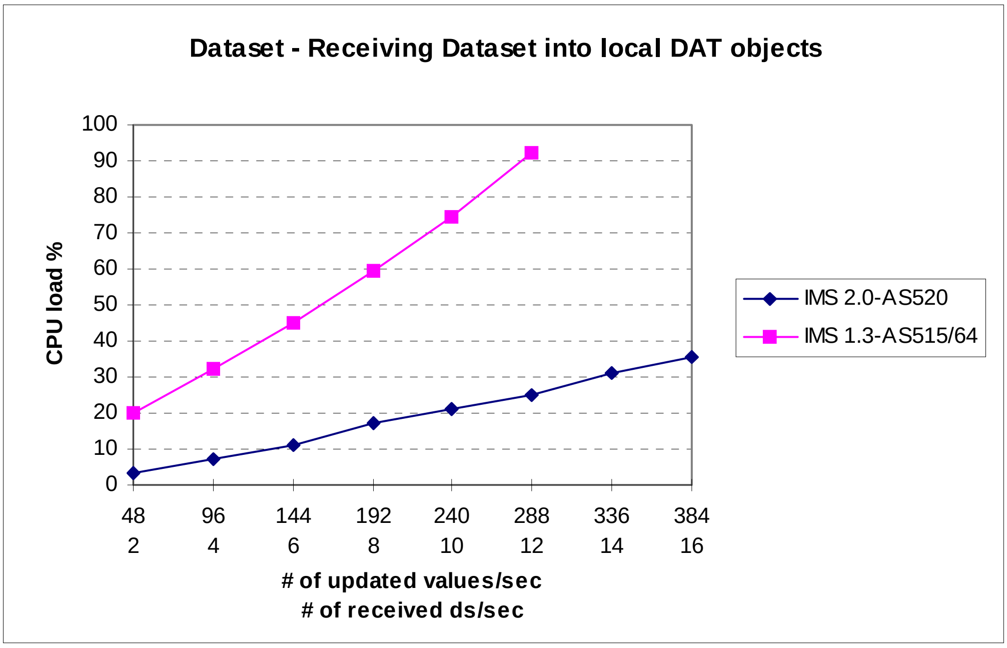


Figure 4-13. Datasets delivered to DAT objects

Datasets are sent from Advant Controllers to dataset objects in Object Handling and delivered directly to User API programs. There is no storage into local DAT objects.

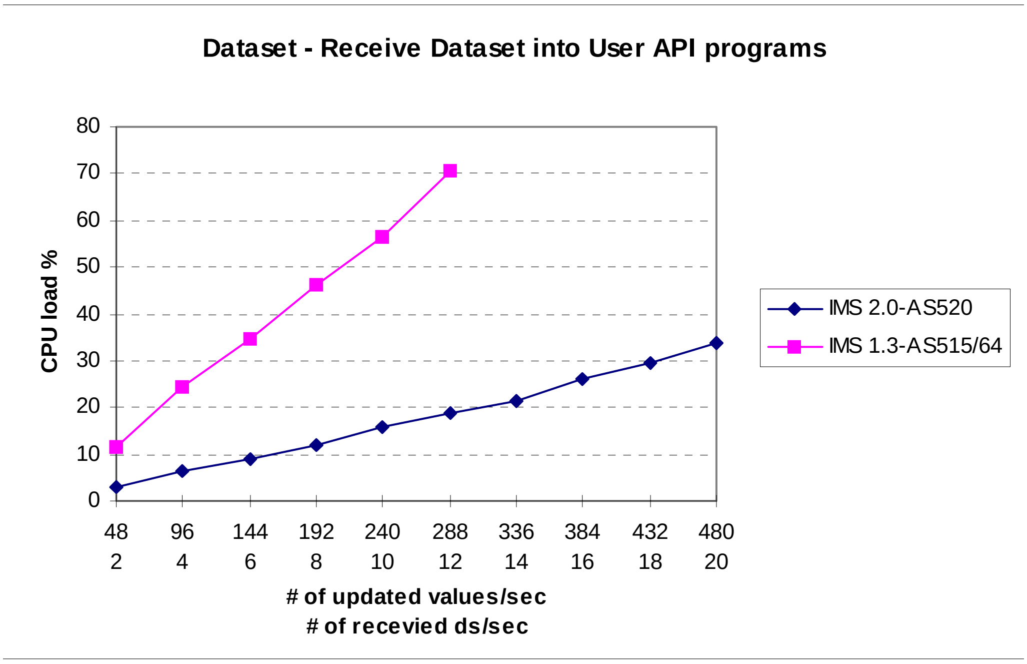


Figure 4-14. Datasets delivered directly to User API programs

4.6.2 Datasets are Sent From Object Handling to Advant Controllers

Datasets are sent from Object handling, and read their data from 24 local DAT objects per dataset. The datasets are sent to Advant Controllers.

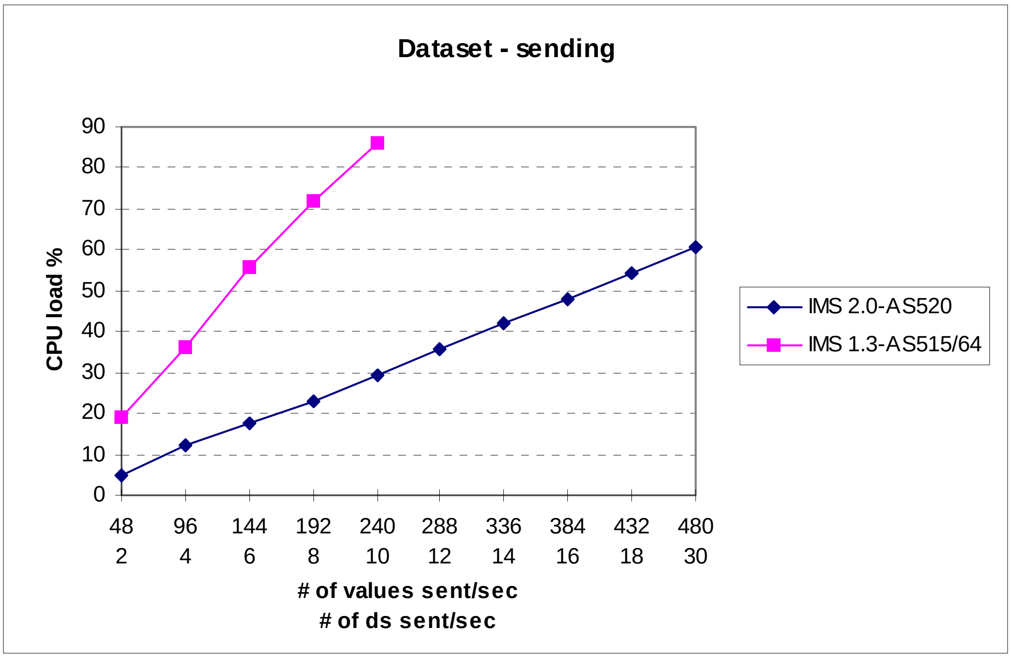


Figure 4-15. Datasets are sent from Object Handling to controllers

4.6.3 Max Test

When requesting and receiving datasets as fast as possible on an AS520, the result is as follows: 19.5 Datasets/second, which corresponds to 468 values/second on demand.

4.6.4 Comparison Dataset with User API

Three different methods to read data are compared:

- User API using Do Request
- User API receiving data from Datasets
- Dataset information stored in local Basic Objects

Figure 4-16, shows that the CPU load is nearly the same if the two User API methods are used, while the Dataset method gives a higher CPU load. Remember that data received through Datasets and stored in local basic objects can be provided to any data client while they are still local to the User API program in those two methods.

Also remember that the two Dataset methods give a significantly lower CPU load and network traffic for Advant Controllers, Control network and RTA; however, extra configuration work is required to establish the Dataset traffic.

Reading data through User API Demand requests is about six times more demanding on the CPU, and is therefore not included in the comparison.

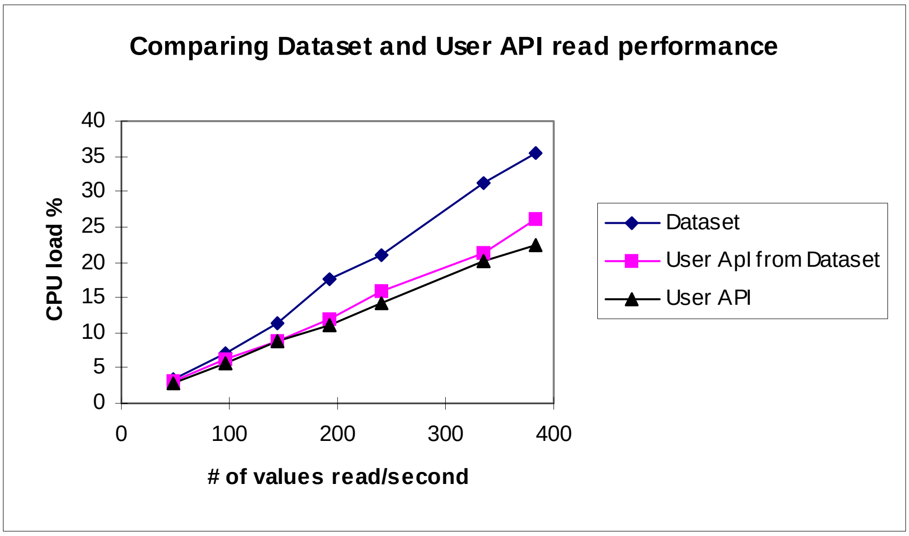


Figure 4-16. User API - Comparing CPU load for User API and dataset respectively

If you compare sending data (request operations to be executed for User API) to a Controller the Dataset is much more powerful. The upper limit (which is about 70 operations executed per second) can be compared with 480 objects updated per second at a 35% CPU load for Dataset. Dataset should be used if high performance is requested for output.

4.7 AdvaInform Calculations (Master)

The capacity for AdvaInform Calculations is as follows:

- Each calculation instance can have a maximum of 15 floating value as input.
- Each calculation instance can have a maximum of 15 integer long value as input.
- Each calculation instance can have a maximum of 2 Boolean value as inputs.
- Each calculation instance can have a maximum of 4 floating value as output (2AO, 2 AI).
- Each calculation instance can have a maximum of 4 integer long value as output (DAT).
- Each calculation instance can have a maximum of 2 Boolean value as output (1 DI, 1 DO).
- The maximum size of each script module is 65,000 characters.
- A maximum of 2700 active instances or 8100 connections are allowed.

The limitations are not more than 2700 calculation instances or not more than 8100 in- and outputs, whichever occurs first.

When AdvaInform Calculations is installed, the primary memory capacity needs to be extended according to the instructions in Chapter 2, Installation.

To estimate capacity limitations see Figure 4-17 which shows the performance for three calculations of different sizes: one with 4 inputs and 1 output, one with 10 inputs and 1 output and one with 32 inputs and 8 outputs. All inputs are read from Controllers, all outputs are stored in Basic Objects (Oracle shadowing active).

The following are general guidelines on performance for AdvaInform Calculations:

- Using a few large Calculations is more effective than using many small calculations. If your calculations can be done several at a time in a larger calculation, do so. See Figure 4-18.
- If your application needs to read a lot of data per time unit, use large Calculations with many inputs per calculation. This results in more efficient use of the core system and the core of the Calculation system. See Figure 4-18.
- If the results of your Calculations do not need to be stored permanently after each execution, turn off the Oracle shadowing for the objects where the result is stored. As an example, the CPU load for an Basic Objects is 10 times higher with oracle shadowing on.
- The load is lower when data is read from outside the local node as the work of the data server does not become included in the CPU load.
- Calculations performance is very much dependent upon CPU and primary memory. A more powerful machine significantly improves performance.

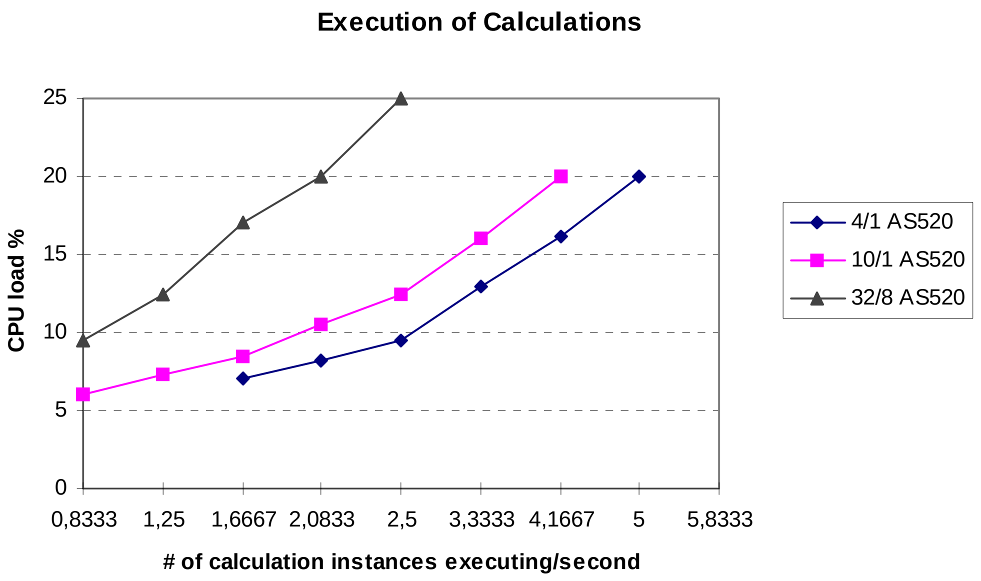


Figure 4-17. Performance curves - calculation instances

The CPU load related to the number of inputs read per second is shown in Figure 4-18.

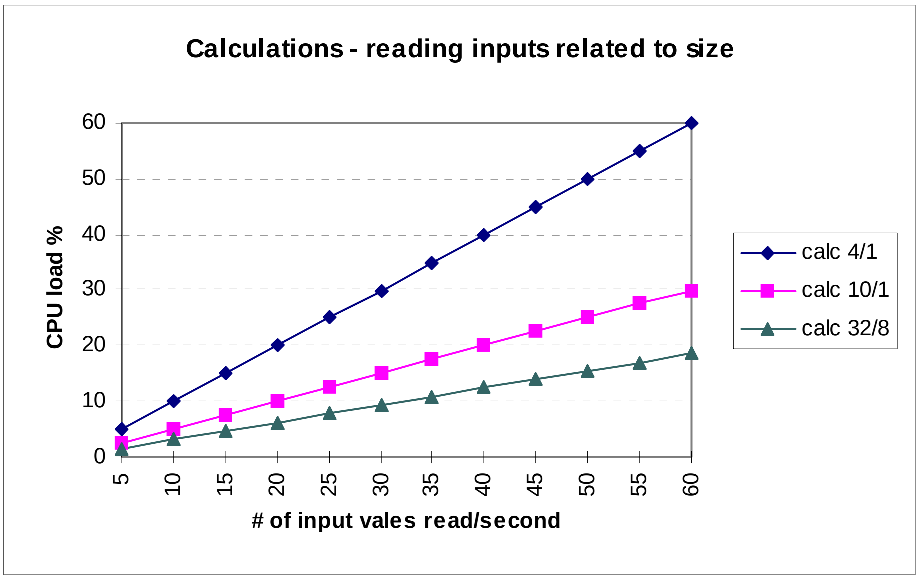


Figure 4-18. Calculations - CPU load related to number of inputs

4.8 AdvaInform Event Log (Master)

The Event Logs can be stored in two different databases of your choice.

- The Event Log database. Capacity = 100,000 events.
- The large Event Log database. Capacity 1,000,000 events.

Typical CPU load applied by the Event Log function are described in Figure 4-19. The conditions such as the size of the database (the logs) vary somewhat; however, a rough estimate can be read from the graph. x = number of events per second.

Low event frequency (lower than 5events per second): CPU% = 2.2 x events/second

Medium event frequency (5 - 10 events per second): CPU% = 1.6 x events/second

High event frequency (more than 10 events per second): CPU% = 1.35 x events/second

High, medium and low in this sense is not related to the state of a process but to the ability of the AdvaInform Event Log option to historize the events.

The maximum that the Event Log can historize is at least 20 events/second. With 20 events collected per second the event list on an RTA could theoretically be emptied in less than a minute. Other parts of the system will limit the number of events generated in the system per second so Event Log will hardly be the limit.

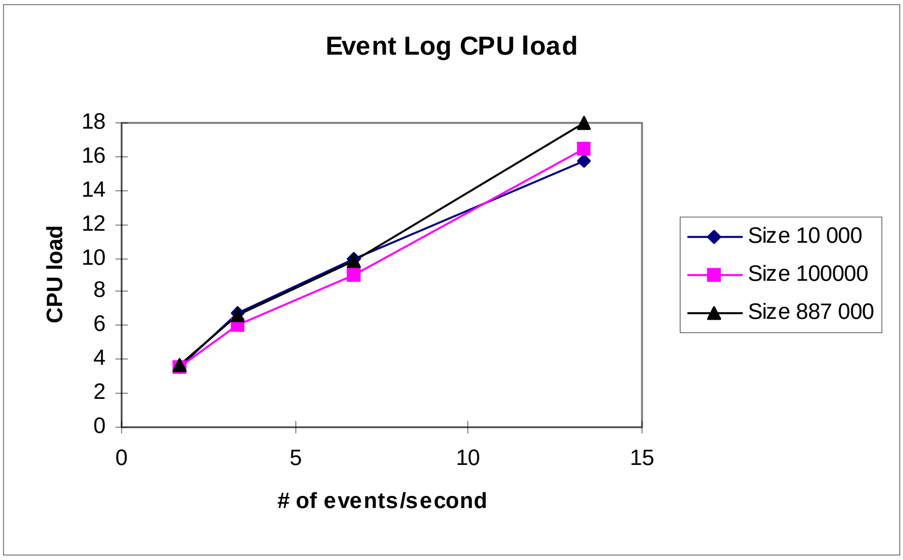


Figure 4-19. Event Log Average CPU Load

The time for the Event Log presentation display is dictated by the time it takes to retrieve the events from the event log database. Typical retrieval times are indicated in Table 4-2.

Table 4-2. Event Log presentation performance in seconds

Number of events retrieved by the Event Log presentation display on a request(1)	**AS530/C110**	**AS520/B132L**
1000	2	2
2000	2	4
10000	9	16

(1) AS530/C110 has Fast Wide SCSI disk configuration and is thus faster in disk accesses.

4.9 AdvaTalk Link to MATLAB

Each on-line object has the following maximum inputs and outputs:

- 64 floating point input values
- 32 boolean input values
- 16 floating point output values
- 16 output boolean values

Not more than 8100 inputs and outputs can be configured in active on line objects.
The performance of the on line part of the AdvaTalk Link to MATLAB has been measured in a series of tests where a number of object instances running in the on-line interface have been executed. The mean value of three series of tests is indicated in Figure 4-20. The test is executed on an AS520. To fully utilize MATLAB, an AS530 may be required.

Figure 4-20 shows the CPU load implied on the Advant Station when a number of object instances has been executed with different cyclic rates. Each instance has 16 inputs and 2 outputs, which is considered to be a normal amount of data in and out. The MATLAB script that is executed is simple, so normally the MATLAB part of the CPU load will be larger.

The Link to MATLAB takes less than approximately 50% of the CPU load that MATLAB does.

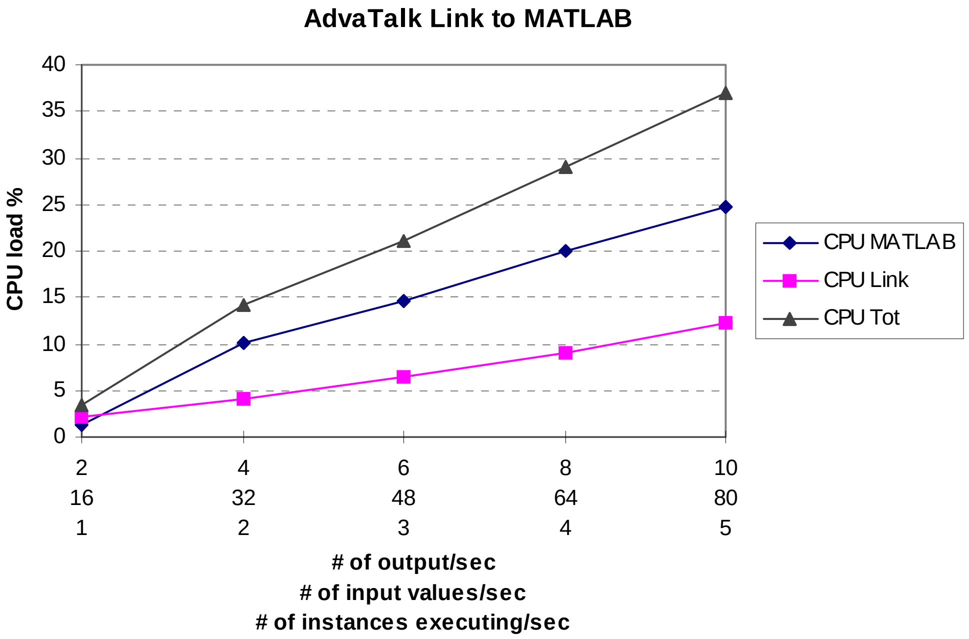


Figure 4-20. Link to MATLAB performance

The performance of the off-line interface is more difficult to present. Generally, the off-line interface responds very fast. The only thing that may slow it down is symbol name resolution.

4.10 Typical Configurations

4.10.1 Typical Configuration 1 - Master

4.10.1.1 General

An Advant Station 530/C110 ran for 10 hours without any user interaction, in a large Advant OCS network with many nodes. It was placed in the plant network and collected data from many different nodes in three different control networks. It was equipped with 128 MB primary memory and the following options were installed:

- History and Reports
- Object Handling, Dataset and Calculations
- Event Log
- UPS

4.10.1.2 Active Logs, Objects, Calculations and Reports

The following active objects, logs were executed:

AdvaInform History:

- 12,100 numeric logs with 222 values collected and stored per second.
  Defined for totally 22,000,000 stored entries.
- One report log. All Reports stored here.
- One asynchronous message log

AdvaInform Reports:

  - 20 reports that execute once an hour and are stored in the Report log.
  - 5 reports collect 400 values/report through SQL*Connect at each report execution
  - 5 reports collect 600 historical values one hour backwards for 3 Historical logs
  - 5 reports collect messages from a message log
  - 5 reports collect 20 values, 1 message log, 600 historical values one hour backwards for 3 Historical logs and some values from the relational database

AdvaInform Event logs:

- Two event logs with cycle time 30s and size 100,000 and 40,000.

AdvaInform Object Handling

- Basic Objects:
  - 300 AIs, where 24 had input connection defined, with a cyclic interval of 15 seconds.
  - 300 AOs
  - 300 DIs
  - 300 DOs
  - 300 TEXTs
  - 300 DATs + 768 DATs used in datasets
- User Objects:
  - One "shuffleobject" that read data from objects in controllers and put it into the 80 local object instances of the basic objects AI, AO, DI and DO (320 objects in total). Executes every minute.
- Datasets:
  - 16 sending datasets, cycle time 10 seconds.
  - 32 receiving datasets, cycle time 10 seconds

AdvaInform Calculation

- 69 calculations with five input variables and two output. Executed every minute.

Total Object Handling and Calculations:

- 12 values read per second (User Objects and Calculations)
- 8.3 values stored in local objects per second (from the User Objects)
- 77 values read per second using Datasets
- 77 values per second stored in local DAT objects

4.10.1.3 Active Data Clients (operator stations)

A number of displays continuously requested data. Every fifth minute they shifted to a similar display with other objects/logs:

- 1 process display showing 100 basic objects (2 attributes) each, with 9 seconds update. (22 object values read per second)
- 3 trend displays with 4 trends on each. Refreshed every 30 seconds.
  (3*4/30 = 0.4 History log buffers requested per second.)

4.10.1.4 CPU Load

The CPU load for the different options did not include the load for the core system and any load the options/functions created in other options, or on Oracle. Table 4-3 indicates the total load over a 10 hour period without any user interaction.:

Table 4-3. CPU load Typical configuration 1

Function	CPU load%
History processes:	8.4
Object Handling and Dataset:	9.8(1)
Calculations:	1.9
EventLog:	1.3
Reports (Reports create more load but those processes only execute over a short time period and cannot be measured with this kind of test.)	0.01
Alarm and event distribution:	0.014
System status supervision:	0.4
The core system processes:	29
The Oracle processes:	1.6
Miscellaneous Unix processes	0.45
TOTAL	**53**

(1) The high CPU load for the Object Handling and Dataset is partly because of the 24 Basic Objects reading one value each. A very ineffective data transfer method. There are also a number of data clients reading data continuously from Object handling.

4.10.2 Typical Configuration 2 - Master

4.10.2.1 General

An Advant Station 520/B132L was running for 10 hours without any user interaction and in a large Advant OCS network with many nodes. It is placed in a Control network with about 8 Advant Controllers and 4 Operator Stations. It collects data from many different nodes in the control network. It was equipped with 128 MB primary memory and the following options installed:

- History and Reports
- Object Handling, Dataset and Calculations
- Event Log
- UPS

4.10.2.2 Active Logs, Objects, Calculations and Reports

The following active objects, logs were executed:

AdvaInform History:

- 9,600 numeric logs with 158 values collected and stored per second. 26 from logging the object attributes directly, 132 coming from TTD logs.
  One report log. All Reports stored here.
- One asynchronous message log

AdvaInform Reports:

- Four reports that executed once an hour and stored in the Report log.

AdvaInform Event Log:

- One event log with cycle time 30s and size 40 000.

AdvaInform Object Handling

- Basic Objects:
  - 300 AIs, where 8 had input connection defined, with a cyclic interval of 15 seconds.
  - 300 AOs
  - 300 DIs
  - 300 DOs
  - 300 TEXTs
  - 300 DATs + 384 DATs used in datasets

- User Objects:
  - One “shuffleobject” that read data from objects in controllers and put it into the 80 local object instances of the basic objects AI, AO, DI and DO (320 objects in total). Executed every minute.
  - 480 coRTM objects, executed once a day and updated each time their respective input DI changed.
  - One DAT control object that wrote to 24 DATs (in controllers) every 20 second.
- Dataset:
  - 8 sending datasets, cycle time 10 seconds.
  - 16 receiving datasets, cycle time 10 seconds

AdvaInform Calculation

- 64 calculations with five input variables and two output. Executed every minute.

Total Object Handling and Calculations:

- 11.2 values read per second (User Objects and Calculations)
- 7.8 values are stored in local objects per second (from the User Objects)
- 38 values read per second using Datasets
- 38 values per second are stored in local DAT objects
- 1.2 execute operation (output to Advant Controller) per second

4.10.2.3 Active Data Clients (operator stations)

A number of displays continuously requested data. Every fifth minute they shifted to a similar display with other objects/logs:

- 2 process display showing 100 basic objects (2 attributes) each, with 9 seconds update. (2*22= 44 object values requested per second).
- 2 trend displays, each one of them with four trends showing History logs and one trend showing TTD via AdvaInform Basic Functions. Each trend refreshed every 30 seconds. (0.2 History log buffers requested per second, 0.05 TTD logs collected per second).

4.10.2.4 CPU Load

The CPU load for the different options did not include the load for the core system and any load the options/functions created in other options or on Oracle. The core system load and the oracle load are presented as separate items. Table 4-4 indicates the total load over a 10 hour period without any user interaction.:

Table 4-4. CPU load Typical configuration 2

Function	CPU load%
History processes:	6.6
Object Handling and Dataset:	5.2
Calculations:	1.8
EventLog:	0.7
Reports (Reports create more load but those processes only execute over a short time period and cannot be measured with this kind of test.)	0.01
Alarm and event distribution:	0.03
System status supervision:	0.36
The core system processes:	21.6
The Oracle processes:	2.57
Miscellaneous Unix processes	0.4
TOTAL	**39.3**

Chapter 5 Maintenance

5.1 Trouble Shooting

When you run into a problem related to your IMS software, use the following sources of information:

- Documentation
- Release Notes
- Status Reports.

Follow this procedure to examine the IMS to find problems and take the appropriate action:

1. Start the System Status Display from the IMS menu:

   Use the Node Status display to verify that the IMS node is OK, and verify that all the processes are running (all items under Software are green). At the same time you can verify that the hardware devices and printer queues are OK.

   Check that all nodes are up and accessible.

   Master: Check with the System Status Display. There are two displays to use, MasterNet 1 or 2 and the System Status Overview. The MasterNet display shows if you can communicate with the other node, the System Status Overview display if the other nodes summary status is OK. For more information about System Status see the *AdvaInform Basic Functions User´s Guide*.

   MOD 300: Check the network communication with a System Status display on an Operator Station or on a MOD 300 Console.

   NOTE

   If you can not access the System Status display, the cause may be that some core process is down. This can be checked with **“`$ps -uocsmgr | grep om`”.** This command should show that all core system processes are running. If less than seven processes (Master) or four processes (MOD 300) are running, you must restart the IMS.

2. Activate the System Messages Display from the IMS Menu. For all messages within the last hours or within the time scope that you estimate is relevant, check for errors of category E or F. You may also have to inspect the messages of category I.
3. Check the disk space to verify that the disks are not full:

   ```
   $ bdf
   ```

   If any of the file systems has a capacity usage of more than 98% you should start preventive actions as described in Section 5.3, Preventive Maintenance.

4. Check the swap space. The total swap space should be at least 2 times the Primary memory. To check:
    a. Log in as **root**.
    b. Execute the following commands:

       `# swapinfo` (to see swap space add all rows with "KB avail")

       `# /usr/sbin/dmesg` (to see primary memory, see available physical memory in the end)

    If you need to add swap space, use the HP SAM utility which is accessible via the **Maintenance** menu item in the **Settings** menu of the IMS Menu.

5. If the problem is bad performance, check the system load.
    a. Use the `top` command to see if any process is looping (continuously takes a very high load). To exit `top`, enter **`q`**.
    b. Use the IMScpuLoad measurement tool over a five minute period. From your home directory, enter:
       `$ /opt/advant/IMS/bin/IMScpuLoad 300` (300 = 300 seconds)

       This gives you a list of the processes with a significant CPU load. If the swap daemon is included in this list, it may indicate swap problems or lack of primary memory. See step 4 above for adding swap space. See Chapter 2, Installation for information about extending primary memory.

       If the Oracle shadow processes (oracleadvantdb) give a constantly high load, you may have to tune the Oracle database. This is rare, and will always require assistant from ABB. You may not alter any Oracle database parameters by yourself.

6. If there are problems with AdvaInform History, AdvaInform Reports, AdvaInform Calculations, AdvaInform ObjectHandling or AdvaInform EventLog, check the corresponding status displays.

    Are there any strange statuses or execution times?

7. If there are problems with AdvaInform Object Handling, check that the object handlers included in Object handling work properly. Enter:

    ```
    $ ps -uocsmgr | grep handler
    ```

    `basichandler` (AI, AO, DI, DO, DAT, TEXT, DATASET)
    `basic2handler` (coRTM, coExecutor, coBasicCalc)
    `modbasichandler` (DATA_FCM, VA_STRING_FCM) (MOD 300 only)

    If Reports and Calculations are installed you will see those handlers as well.

8. Check the status of your own object handlers. Enter the menu item ObjectHandlers or enter Object Type Builder and execute "`ObjectHandlers list`"

    All started handlers should all have the status started.

9. If there are problems with AdvaInform History, do the following.

    To inspect the status of any logs you experience problems with use the History Run Time Status display. Then go into details using the History Builder.

    To make sure that your archive logs work properly, use the View Logs window. Any strange status? Are all logs active?

10. If none of these investigations have given any clues to the cause of your problems, you can temporarily re-start IMS with trace logging active.

    a. Set **“`export SYSTEM_LOG_ACTIVE=Y`”** in the file **“`/opt/advant/Startup/etc/dcStartup.env`”**

    b. As root, start-up IMS with logging:

    ```
    # /opt/advant/IMS/bin/IMSstart -v
    ```

    c. Examine the output to **`/var/opt/advant/log/IMS/dcSystem.log`**

NOTE

Running IMS with trace logging active degrades performance and step by step fills your root disk (dcSystem.log). Thus, keep the time you run with traces as short as possible.

    d. If you start-up IMS with `IMSstart -v -log -nosup`, instead of `dcSystem.log,` you will get a lot of files under `/var/opt/advant/log...` etc.
    This makes it easier to find the traces that you are interested in.

    e. To increase the detail level of the traces you can give the command **kill -USR2** to different processes PID. Processes will then log trace in the directory `/var/tmp/`. This will fill your disk even more rapidly. The output text files shall be investigated by ABB.

    – dcTTDLog process (TTD logging) (Master only)

    – Log Manager process (All data retrievals from User API, SQL*Connect Client, Operator Stations)

    – hsCollection (Log collection)

    – hsStorage (Data storage)

    – hsServer.

    – hsMODInterface(MOD 300)

    – All Object Handlers

5.2 System Message presentation

5.2.1 System Message Display

The normal way to study system messages is by using the System Message Display. It gives you all the necessary features and is described in AdvaInform Basic Functions User´s Guide.

5.2.2 bsLogTool - non graphical presentation

The bsLogTool gives you an ability to study the system message even if you are not logged in through a graphical display. This can prove to be very useful if you for example are logged in via a modem.

bsLogTool is started from a terminal window with the command:

```
/opt/advant/IMS/bin/bsLogTool
```

The bsLogTool has the following parameters:

```
USAGE: bsLogTool [operator] [engineer] [service] [debut]
            [information] [warning] [error] [fatal]
            [-f=<from log nr>] [-t=<to log nr>]
            [-l=<last nr of logs>] [-h]*
```

Parameters	**Usage**
	When you enter bsLogTool for the first time, just run the utility without parameters. It will give you a list of the total number of logs and the log numbers
operator engineer service	You can specify any of these categories to select the system messages belonging to that category. Otherwise all system messages are presented.
information warning error	You can specify any of these severity levels to select the system messages belonging to that severity. Otherwise all system messages are presented.
-f log number	from log number, use the log number information from running bsLogTool without parameters
-t log number	to log number, use the log number information from running bsLogTool without parameters
-l	to last log
-h	help

5.2.3 General Error Messages

"Cannot fork: Too many processes"

The operating system has reached the limit of number of processes per user, or total for the entire computer. Normally you can avoid this problem by using your own operating system user as owner to your application programs.

You can use this command to verify the number of processes for a user, in this case ocsmgr. The first number in wc reports number of lines = processes.

```
$ ps -u ocsmgr | wc -l
```

You can also increase the allowed number of processes per user by increasing the `nproc` kernel parameter in SAM, and creating a new kernel. However, if you upgrade to a new AS500 IMS version later, this change will be lost, and you have to do it manually again.

It is recommend that you use several users instead.

5.3 Preventive Maintenance

If you know that you have had problems with function crashes, you may have core files on your disks. Third, if have you ever run IMS with logging activated, see Section 5.1, Trouble Shooting, you should delete all log files under `/var/opt/advant/log/`

NOTE

Do not remove directories under /var/opt/advant/log/

To check for core files that can be deleted:

1. Log in on the IMS Menu as ocsmgr and open **System-Maintenance**.
2. Choose **Routine Tasks**.
3. Choose **Disk Space Recovery**.
4. Choose **Core File Removal**.
5. Skip the initial search?: **Yes**.
6. Choose **Actions - Modify search criteria**.
7. Use search criteria /.

5.4 Problem Reporting

If a problem occurs which you can not solve by yourself, contact your local ABB Industrial Systems representative. This includes problems and errors that you have identified as being related to AdvaInform Basic Functions, AdvaInform, AdvaTalk and AdvaBuild options, the operating system HP-UX, Oracle RDBMS or any Oracle tool.

When you contact ABB please enclose all information that you have related to the problem. For example, it may be a description of changes you made in your system prior to the problem. Or it may be printouts of error logs and hard copies of configuration displays. The more information you can supply the shorter time for a response.

5.5 Maintenance Tools and Recommendations

The system manager maintains the system from the IMS menu by:

- Adding or deleting users
- Changing defaults. Examples: Editor and Mail
- Changing setups. Example: node name and node address

The tools are accessed from the **Settings** menu in the IMS menu bar. Instructions for these tools are provided in Section 3.6, Administration and Maintenance Functions.

The tools for backup and restore are described in Section 5.7, Backup and Restore.

It is recommended that you DO NOT change the settings of the HP-UX kernel. Buffers, swap space, semaphores and so on have been set to insure that IMS has the capacity to handle AdvaInform functionality and still maintain the best possible performance.

Some third party software may require a rebuild of the HP-UX kernel. The system manager may only increase a system parameter (decreasing a parameter may result in decreased IMS capacity and performance).

NOTE

If you add more primary memory (RAM) you have to increase swap space by adding a file swap (fs). Total swap space is recommended to be set to at least twice the primary memory size.

5.6 Hardware Indicators

Hardware indicators are described in the appropriate *Advant Station 5xx Series Hardware User's Guide*.

5.7 Backup and Restore

5.7.1 Introduction

This section describes the station backup for the AS 500 IMS. You can perform the station backup and restore on three levels: full, incremental and History.

The general philosophy for backup should be:

1. The base is always a full backup. If you have a total disk failure, a full backup is required to restore the system to a functioning level.
2. The incremental backup is required for two purposes:
   - To incrementally backup the configuration changes you have done since the last backup (including any changes to the RTA Master).
   - To backup the Event Log database (run time data)

   Once your system is configured and continuously running and you do not have Event Log, the need for incremental backup is low.
3. The History configuration and run time data is backed up through the History backup function hsBAR. You can execute hsBAR with a standard backup configuration using the Station Backup. If you want to run hsBAR according to specific parameters read the AdvaInform History User´s Guide and execute it according to your own needs.

5.7.1.1 Full Backup and Full Restore

Full Backup makes a complete backup of the IMS disks and the Full Restore function restores them. The full backup and restore functions require that the IMS be shut down.

NOTE

The Full Backup and Restore functions can not be executed on a cyclic basis.

5.7.1.2 Incremental Backup and Restore, Functional Restore

The Incremental Backup saves the current system configuration and stores the database backup and all other modified disk files on a selected set of directories on DAT tape. By complementing the Full Backup with a repeated Incremental Backup, your installation and configuration and application data are secured, Figure 5-1. The restore function restores all files that no longer exist on the system. It does not overwrite files with the same or newer time stamp. The Incremental and Functional restore functions require that the IMS be shut down.

The incremental backup secures all files that have changed since the last full backup. That is, it is incremental towards the last full backup, not towards the last incremental backup.

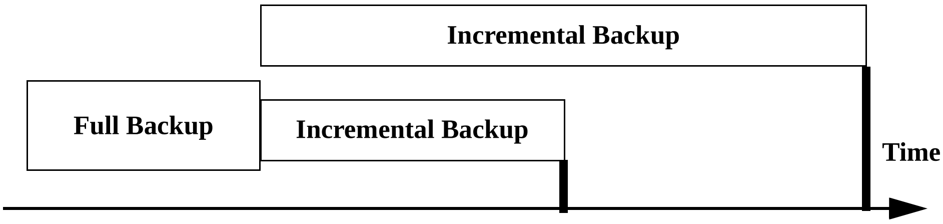


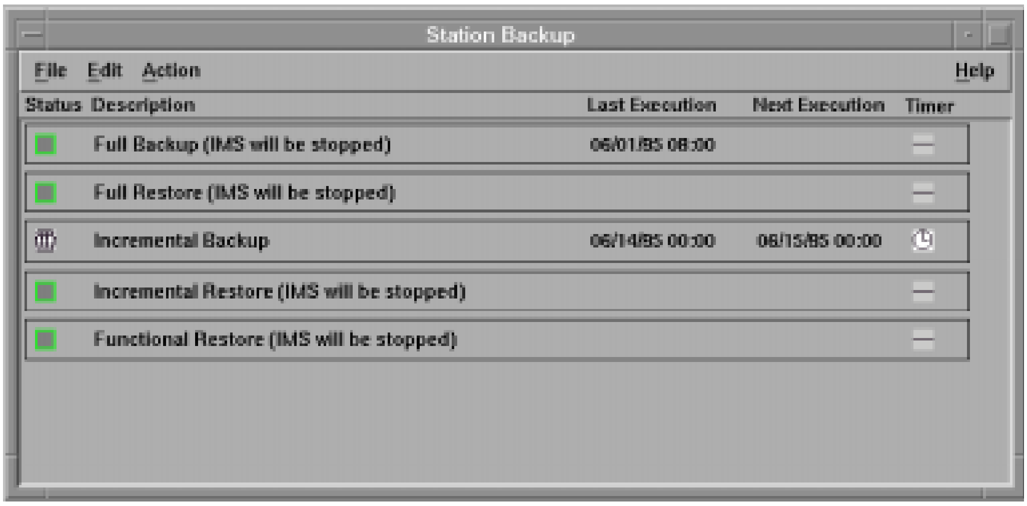
Figure 5-1. Principles of Incremental Backup

NOTE

The Incremental Backup does not support Historical data. Historical data should be saved using the History backup function hsBar combined with the History Archive functions.

5.7.1.3 The Station Backup window

Backup and restore functions are supported by the Station Backup window, Figure 5-2.



Status	Description	Last Execution	Next Execution	Timer
🟩	Full Backup (IMS will be stopped)	06/01/95 08:00		=
🟩	Full Restore (IMS will be stopped)			=
	Incremental Backup	06/14/95 00:00	06/15/95 00:00	🕒
🟩	Incremental Restore (IMS will be stopped)			=
🟩	Functional Restore (IMS will be stopped)			=

Figure 5-2. Station Backup window

This window provides access to full and incremental backup and restore functions. You can perform these functions on demand or according to a schedule. In addition, you can change program data (specify a disk device other than the default device), and check the status of a backup/restore function in progress. To use this window you must be logged in to the IMS Menu at the SYSTEM user level. The Station Backup window has the following fields:

Status Column	Indicates the status of the corresponding function. See Section 5.7.6, How to Interpret Status Indicators. Clicking on the status symbol displays a trace log for the function.
Description Column	Lists the functions you can run in this window. The functions are: Full Backup, Full Restore, Incremental Backup, Incremental Restore and Functional Restore. Click on a function in this column to select it.
Last Execution Column	Indicates the date and time for the last execution of the corresponding function.

Next Execution Column	Indicates the date and time for the next execution of the corresponding function if the backup is cyclic (executed according to a schedule).
Timer Column	Indicates whether or not the cyclic timer is enabled. The meaning of the symbol is explained in Section 5.7.6, How to Interpret Status Indicators. Clicking on the timer symbol displays the Execution Configuration dialog box where you can schedule backup/restore functions. See Section 5.7.7, How to Schedule Backup/Restore Functions.

The Station Backup window menus contain the following items:

File -	Exit	This menu item closes the Station Backup window.
Edit -	Change Program Data	This menu item displays the Change Program Data dialog box where you can edit Optional arguments (specify the disk device for Backup/Restore) and edit the Description field. See Section 5.7.5, How to Change Program Data.
	Define Timer	This menu item displays the Execution Configuration dialog box. where you can schedule backup/restore functions for cyclic execution. See Section 5.7.7, How to Schedule Backup/Restore Functions. **Note that the Full Restore and Backup functions can not be executed on a cyclic basis.**
Action -	Start Program	This menu item starts the selected function(s).
Help -	On Window	This menu item displays a message box that explains the different symbols that are used to show Status and Timer.

Step-by-step instructions for backup and restore procedures are provided in Section 5.7.2, Basic Procedure for Backup and Restore through Section 5.7.7, How to Schedule Backup/Restore Functions.

5.7.2 Basic Procedure for Backup and Restore

The basic procedure for all backup and restore functions is essentially the same. You must connect the DAT device to an available SCSI address, for example SCSI 3, log into the IMS menu as a SYSTEM category user, choose **Station Backup** from the **Settings** menu to open the Station Backup menu, and then select the appropriate function in the Description column in that window. This basic procedure is described below. Specific instructions for the individual functions are provided in subsequent sections.

NOTE

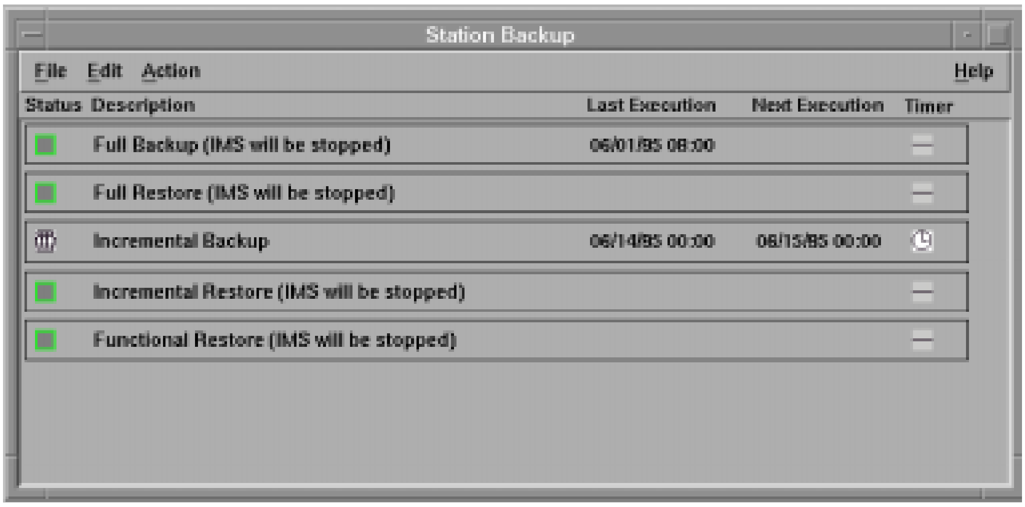
Two procedures that do not follow this basic pattern are full restore from HP-UX command line (when IMS menu is not available) and full restore using HP-UX Core-OS CD (when HP-UX command line is not available). These procedures are described in Section 5.7.3.4, Full Restore from the HP-UX command line and Section 5.7.3.5, Full Restore using HP-UX Core-OS CD.

To initiate a backup or restore function via the Station Backup window:

1. Connect the DAT device to SCSI 3.
2. Load the DAT device with a Backup tape.

   For backup functions use an empty backup tape. For restore functions use the tape that the backup data was stored on.
3. Log in to the IMS Menu at the SYSTEM user level. See Section 2.2.1, How to Log Into the IMS Menu.
4. Choose **Station Backup** from the **Settings** menu on the IMS menu.

   This opens the Station Backup window, Figure 5-3.



Status	Description	Last Execution	Next Execution	Timer
🟩	Full Backup (IMS will be stopped)	06/01/95 08:00		
🟩	Full Restore (IMS will be stopped)			
	Incremental Backup	06/14/95 00:00	06/15/95 00:00	
🟩	Incremental Restore (IMS will be stopped)			
🟩	Functional Restore (IMS will be stopped)			

Figure 5-3. Station Backup window

5. Select the appropriate function in the Description column.

NOTE

> If you want to use a destination device other than default (`/dev/rmt/0m`), choose **Change Program Data** from the **Edit** menu, and then enter the appropriate value in the Optional Arguments field (for example: **`-f /dev/rmt/1m`**). See Section 5.7.5, How to Change Program Data for details.

6. Choose **Start Program** from the **Action** menu.
7. Follow the specific instructions in the section that describes the procedure for the function you selected in step 5.

5.7.3 Full Backup and Full Restore

5.7.3.1 General

Full Backup makes a complete backup of the IMS disks and Full Restore restores them. These functions shut down the IMS before performing the backup/restore.

Some preparation may be required before you restore. The reason is that Full Restore restores all files witch where saved on the backup tape. Therefore, if you have a newer version of a file that you want to save on your hard disk, rename it so it not will be overwritten by the file on the backup tape.

NOTE

Restore does NOT erase any files from your disks, it just replaces the files with the files on the Backup or restores files that are lost.

The instructions below for Restore are for the normal cases when you need to restore the content of a destroyed disk or you need to restore some lost files. For these cases, no preparation is required.

If you intend to make a restore when an IMS upgrade has failed, read the Release Notes. All traces of the new IMS have to be removed before you can successfully restore the backup of the old installation.

There are three methods for Full Restore, depending on the status of the IMS.

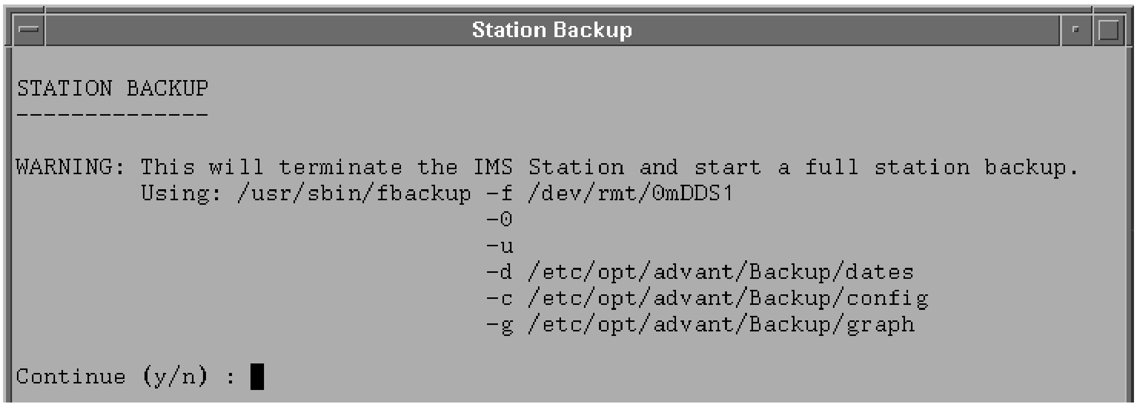
- A limited number of user files have been lost (for instance, when files in a user directory have been deleted accidently). The IMS Menu is available so you can restore via the Backup and Restore window.
- A severe error has occurred but the operating system HP-UX is functioning. The IMS Menu is not available; therefore you can not open the Backup and restore window.
- A serious hard disk failure has occurred and it is not possible to use HP-UX commands.

You can also restore configuration and application data using the Database Restore, see Section 5.7.4.3, Restore of Incremental Backup.

5.7.3.2 Full Backup

To run a Full Backup follow the basic procedure in Section 5.7.2, Basic Procedure for Backup and Restore. Select **Full Backup** in the Description column.

When you choose **Start Program** from the **Action** menu, a terminal window is opened. This window indicates the command to be executed, and provides a prompt to verify whether or not you want to execute the command Figure 5-4.

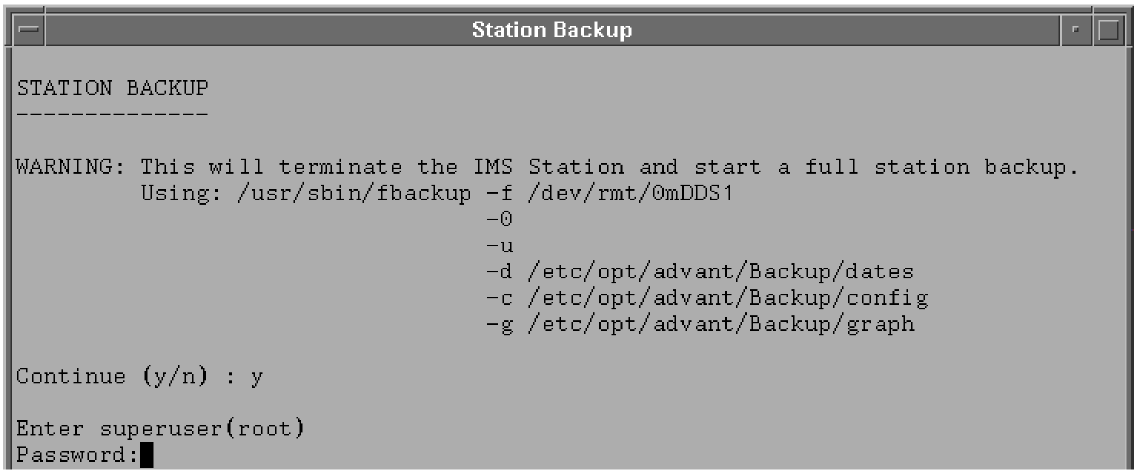


```
STATION BACKUP
--------------

WARNING: This will terminate the IMS Station and start a full station backup.
         Using: /usr/sbin/fbackup -f /dev/rmt/0mDDS1
                                  -0
                                  -u
                                  -d /etc/opt/advant/Backup/dates
                                  -c /etc/opt/advant/Backup/config
                                  -g /etc/opt/advant/Backup/graph

Continue (y/n) :
```

Figure 5-4. IMS Station Backup Prompt in terminal window

Enter **y** to continue or **n** to terminate, then press <**Return**>.

Enter superuser (root) password, see Figure 5-5.



```
STATION BACKUP
--------------

WARNING: This will terminate the IMS Station and start a full station backup.
         Using: /usr/sbin/fbackup -f /dev/rmt/0mDDS1
                                  -0
                                  -u
                                  -d /etc/opt/advant/Backup/dates
                                  -c /etc/opt/advant/Backup/config
                                  -g /etc/opt/advant/Backup/graph

Continue (y/n) : y

Enter superuser(root)
Password:
```

Figure 5-5. Advant Station Backup Prompt in terminal window

NOTE

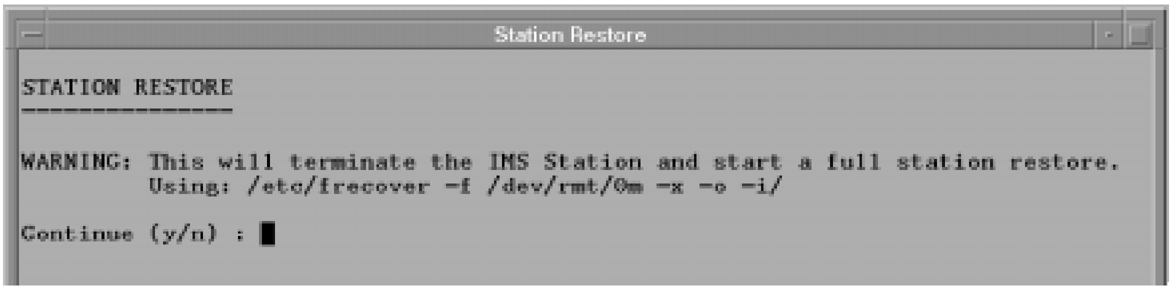
All AdvaInform processes are temporarily stopped during Full Backup and Full Restore. The Advant Station restarts automatically when the backup is finished.

5.7.3.3 Full Restore from the Station Backup Window

The Restore function searches through the file system of the hard disks and matches the files with the files on the backup tape. Make sure that you have read Section 5.7.3.1, General before continuing.

To restore files from the Station Backup window follow the basic procedure in Section 5.7.2, Basic Procedure for Backup and Restore. Select **Full Restore** in the Description column.

When you choose **Start Program** from the **Action** menu, a terminal window is opened. This window indicates the command to be executed, and provides a prompt to verify whether or not you want to execute the command, Figure 5-6.

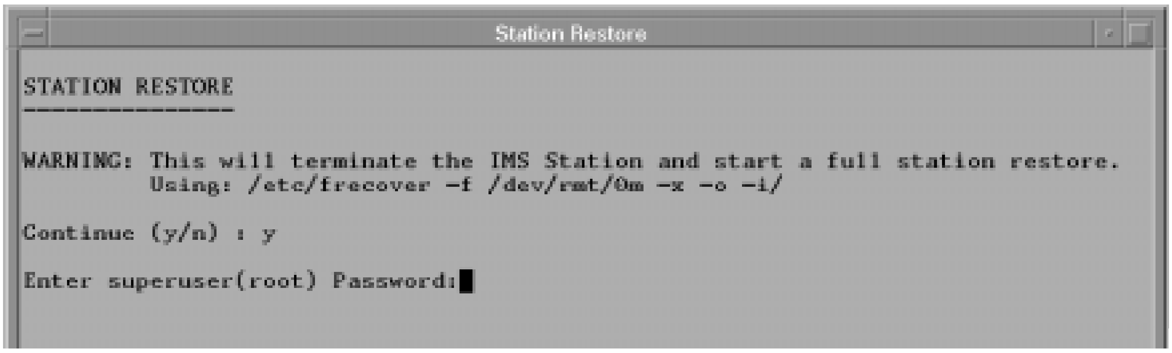


```
STATION RESTORE
---------------

WARNING: This will terminate the IMS Station and start a full station restore.
         Using: /etc/frecover -f /dev/rmt/0m -x -o -i/

Continue (y/n) : 
```

Figure 5-6. Advant Station Restore Prompt in terminal window

Enter **y** to continue or **n** to terminate, then press <**Return**>.

Enter superuser (root) password, see Figure 5-7.



```
STATION RESTORE
---------------

WARNING: This will terminate the IMS Station and start a full station restore.
         Using: /etc/frecover -f /dev/rmt/0m -x -o -i/

Continue (y/n) : y

Enter superuser(root) Password:
```

Figure 5-7. Advant Station Restore Prompt in terminal window

NOTE

All AdvaInform processes are temporarily stopped during Full Backup and Full Restore. The Advant Station restarts automatically when the restore is finished.

If your incremental backup is later (newer date) than the full backup you will probably need to restore the database as well. If so, see Section 5.7.4.3, Restore of Incremental Backup

5.7.3.4 Full Restore from the HP-UX command line

If it is not possible to open up the IMS Menu but you can use HP-UX commands from a terminal window you may use the following procedure for restore:

1. Connect the DAT device to SCSI 3.
2. Load the DAT device with the backup tape.
3. Log in as root from a terminal window.

4. Shut down the IMS and set the station in stand-alone mode:

   ```
   /usr/sbin/shutdown -y 0
   ```

5. Be sure that all disks are mounted before recovery is initiated. Execute the mount command:

   ```
   /usr/sbin/mount -a
   ```

6. Use the following command to restore. Refer to `man frecover` for details on the command.

   ```
   /usr/sbin/frecover -f /dev/rmt/0m -x -o -i/
   ```

   This will take at least one hour.

7. Restart the IMS:

   ```
   /usr/sbin/reboot
   ```

5.7.3.5 Full Restore using HP-UX Core-OS CD

If for example a serious hard disk failure has occurred and you are not able to use HP-UX commands you must reload the HP-UX core-OS software from the CD-ROM. In this case you will load a minimized HP-UX and after that make a full restore.

Before you begin perform the following checks:

- Check that your CD-ROM reader is properly connected. If not connect it according to Section 2.4.7, How to Install HP-UX 10.20 and HP Options.
- As the next step, make sure your DAT tape is properly connected to SCSI address 3. If not, set it using the selector on the rear side of the drive.
- Check that the mouse is connected to the keyboard.
- Verify that the LAN connector for TCP/IP is either connected to the network or terminated.

Load HP-UX from HP-UX Core-OS CD and perform a full restore from DAT tape:

1. Insert the HP-UX Core-OS CD and follow the appropriate procedure for selecting boot path. This procedure is described fully in *Quick Guide to Installation* and *Installing HP-UX 10.10 and 10.20* manuals from HP. Follow the instructions there until Main Menu is displayed. Use command **search ipl** to find path number to CD-ROM.
2. Start the installation of HP-UX by booting from the CD-ROM with command:

   boot <path number>

3. You will be prompted to select keyboard. Choose the appropriate keyboard and continue with the installation.
4. When you proceed with the installation you will enter the View/Modify Basic Configuration menu. From that menu you must.
   a. Set swap size to same size as you had before. Recommended swap size see Table 2-4.
   b. Choose to install minimal system from software selection
   c. If you have more than one hard disk change disks in root group to all.

5. From System Configuration menu change size of each Logical Volume back to the size that where configured before and continue with the installation. Recommended sizes of Logical Volumes see Table 2-5.
6. When the minimized Installation is complete install the backup tape in the tape drive.
7. Log in as root and start perform a full restore with the command:

   ```
   /usr/sbin/frecover -X -f /dev/rmt/0m -x -o -i/
   ```

   If your backup is on more than one tape you will be prompted to insert the next tape during this step.
8. When the restore is complete eject the backup tape and reboot the system.

5.7.3.6 Full Restore to IMS1.3-0

If you want to restore IMS1.3-0 after installed IMS2.0 the following steps must be performed:

1. Install IMS1.3-0 from scratch using the original IMS1.3-0 tape. Only install Basic Unit, no other options.
2. Let the machine boot and the IMS software start.
3. Open the IMS menu - Settings - Station Backup.
4. Insert the tape which was used during Full Backup of IMS1.3-0 and select Full Restore from the Station Backup menu.
5. When the restore is complete eject the backup tape and reboot the system.

5.7.4 Incremental Backup and Restore, Functional Restore

The purpose of the Incremental Backup is to save your current system configuration and application programs and, when required, restore them. The Incremental Backup saves both configuration data from the IMS database and disk data. By complementing the Full Backup with a repeated Incremental Backup and History Backup, your installation and your configuration and application data are secured.

The Incremental Backup consists of a backup and a restore functionality. The backup part is run on-line. It makes an incremental backup of all disk files modified or added since the last full backup. See Backup in Figure 5-8. First, dumps of the IMS database contents are created. Secondly, all modified files including database dumps, are stored onto the backup device.

The restore functionality makes it possible to restore disk files that are accidently lost or destroyed. It also provides the means to restore the content of all or of selected IMS functions, a Functional Restore.The Restore is done in 2 steps, see Figure 5-8. The restore functionality differs if you select Incremental or Functional Restore which yu can see if you study Figure 5-8 and the descriptions of each of the functions.

NOTES

- The Incremental Backup does not support Historical data. Historical data should be saved using the History backup function combined with the History Archive functions.
- The incremental backup automatically excludes all oracle database files.

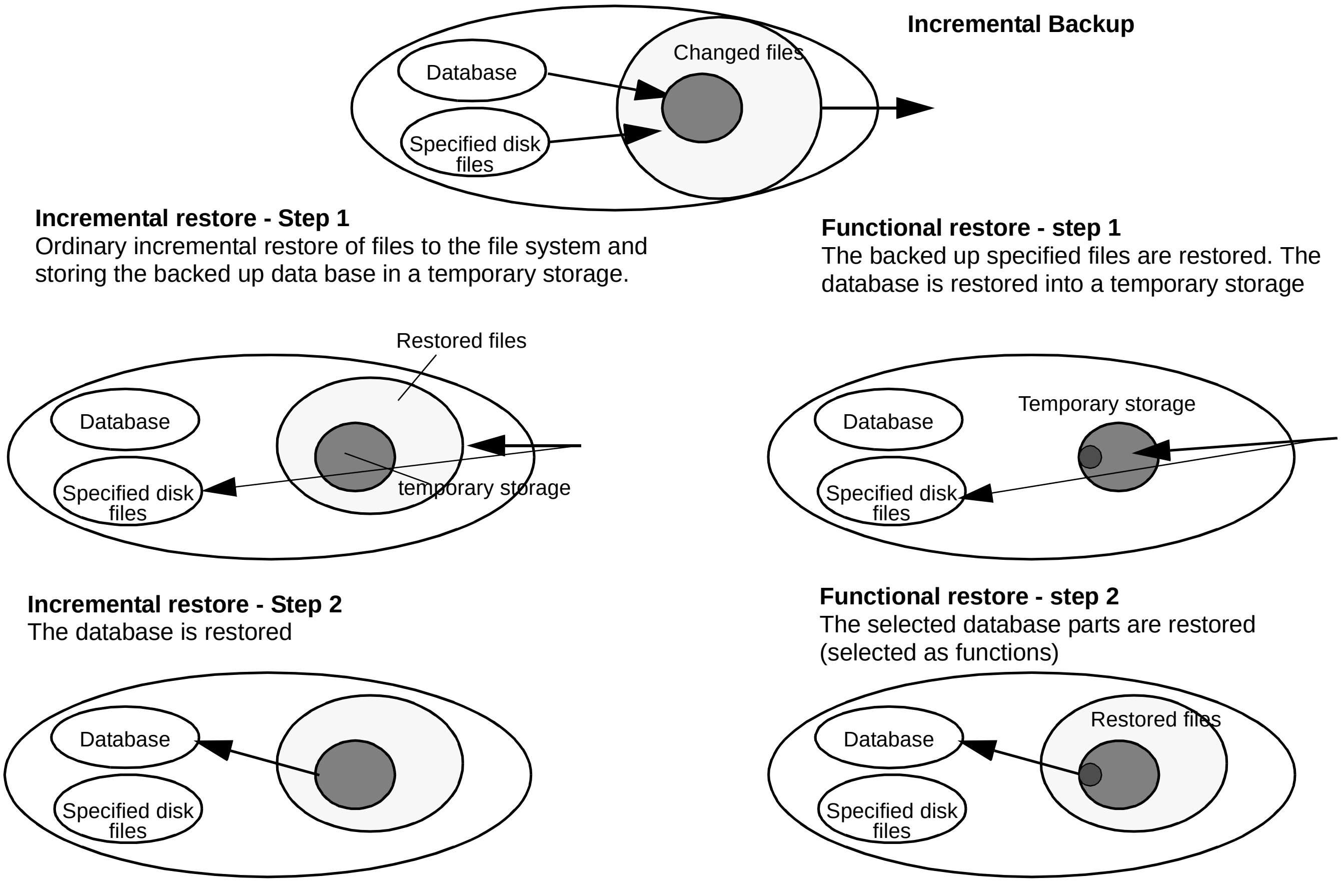

Incremental Backup
Database
Specified disk files
Changed files
Incremental restore - Step 1
Ordinary incremental restore of files to the file system and storing the backed up data base in a temporary storage.
Restored files
Database
Specified disk files
temporary storage
Functional restore - step 1
The backed up specified files are restored. The database is restored into a temporary storage
Database
Temporary storage
Specified disk files
Incremental restore - Step 2
The database is restored
Database
Specified disk files
Functional restore - step 2
The selected database parts are restored (selected as functions)
Database
Restored files
Specified disk files

Figure 5-8. Incremental Backup and Functional Restore

5.7.4.1 Incremental Backup

To do a manual incremental backup, follow the procedure in Section 5.7.2, Basic Procedure for Backup and Restore. Select **Incremental Backup** in the Description column and then choose **Start Program** from the **Action** menu. The symbol in the Status column indicates the status of the function. Refer to Section 5.7.6, How to Interpret Status Indicators for details.

Incremental Backup can also be executed on a daily or weekly basis according to your preference by defining a time schedule using the execution configuration dialog. Refer to Section 5.7.7, How to Schedule Backup/Restore Functions for details.

5.7.4.2 Specifying Backup of your System Application

All IMS configuration tables are automatically included in the incremental backup. This also includes all User Object instance tables. No actions are required from you.

5.7.4.3 Restore of Incremental Backup

A manual Restore of an Incremental Backup restores all files that were lost since the backup. It restores files with a more recent time stamp or which are not found on disks. Therefore, if you have updated a file and want to restore a previous version you have to remove or rename the newer version.

To make a complete restore of an incremental backup follow the procedure in Section 5.7.3.3, Full Restore from the Station Backup Window. Select **Incremental Restore** in the Description column and then choose **Start Program** from the **Action** menu. This will take a while.

5.7.4.4 Functional Restore

The backed up database data is grouped into functions, for example the function Reports. To restore the selected function files and database parts only and nothing else, you select **Functional Restore**. Select **Functional Restore** in the Description column and then choose **Start Program**. This activates the Restore Form window, Figure 5-9. This window provides a list of all functions that are backed up. Select the function(s) you want to restore by clicking the corresponding button(s) to the left of those functions

NOTE

IMS processes are temporarily stopped during Incremental & Functional Restore.

Basic Software includes: BASIC_UNIT, TYPEDIR, SQLCONNECT_CLIENT and SQL_CONNECT_SERVER.

BASIC_UNIT function includes following configuration data:

- Network configuration
- Supervision and System Status configuration
- IMS Menu users
- System Messages
- TTD Log Mapping
- Station Backup configuration.

TYPEDIR function includes complete Type Directory.[1] SQLCONNECT function includes all SQL*Connect Client and Server configuration data.

The options include their respective configuration data. The options are named as follows:

Table 5-1. Function name in the Restore Form

Name	Option
Event_Log	AdvaInform Event Log, PDL and SPC
Reports	AdvaInform Reports
UserObjects	AdvaInform Object Handling(1)

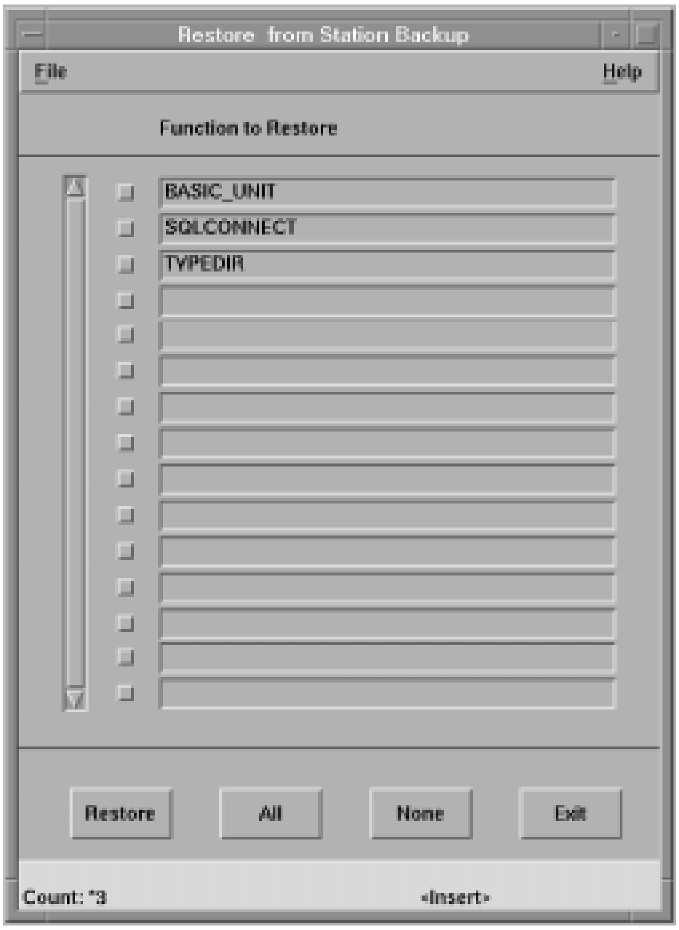
---

[1] The TypeDir, SQL*Connect Server, Object Type Builder and Object Handling functions are handled as one entity

Table 5-1. Function name in the Restore Form (Continued)

Name	Option
Calculation	AdvaInform Calculations (Master only)
MATLAB	AdvaTalk Link to MATLAB
UserObjects	AdvaBuild Object Type Builder(1)

(1) The TypeDir, SQL*Connect Server, Object Type Builder and Object Handling functions are handled as one entity



☐ BASIC_UNIT
☐ SQLCONNECT
☐ TYPEDIR

Count: "3
«Insert»

Figure 5-9. Restore Form window

The Restore Form window has the following push buttons:

Restore	Restore selected functions.
All	Select all functions in the list.

None	Deselect selected functions.
Exit	Exit the Restore Form window.

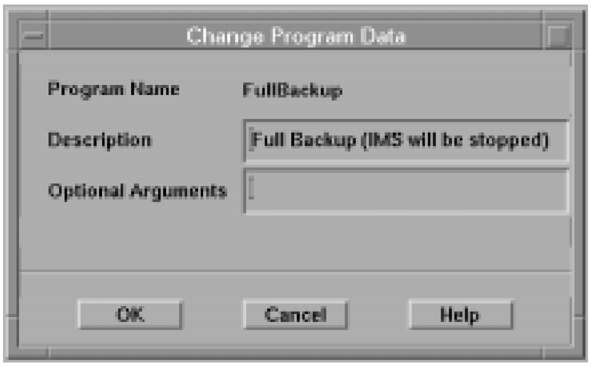
NOTE

The User Object options, the SQL*Connect server functionality and Type Directory are tied together. They must be restored as one entity.

When you press **Restore** button, a dialog box is displayed where you have to confirm your selection. Press **OK** to confirm and continue the restore, or **Cancel** to cancel the process.

5.7.5 How to Change Program Data

To change program data choose **Change Program Data** from the **Edit** menu. This displays the Change Program Data dialog box, Figure 5-10.



Program Name FullBackup
Description Full Backup (IMS will be stopped)
Optional Arguments

Figure 5-10. The Change Program Data dialog box

This dialog provides the means to enter a description of the backup/restore programs.
In addition, you can give arguments to backup/restore programs that are used when the program is executed. For example you can specify a backup device other than the default (`/dev/rmt/0m`).

```
-f /dev/rmt/3m
```

The Change Program Data dialog box has the following push buttons:

OK	Click on **OK** button to save the changed Program data.
Cancel	Click on **Cancel** button to exit the dialog box.without changes.
Help	Click on **Help** button to display the Help message box.

5.7.6 How to Interpret Status Indicators

The status of a backup or restore function is indicated in the Status column of the Station Backup window. The status of the cyclic timer is indicated in the Timer column. The meaning of these symbols is explained in the Help - Station Backup message box, Figure 5-11, which displayed when you choose **On Window** from the **Help** menu.

5.7.7 How to Schedule Backup/Restore Functions

You can schedule backup and restore functions for cyclic execution via the Execution Configuration dialog box, Figure 5-11. To display this dialog box:

- click on the symbol in the Timer column for the appropriate function.

  or

- select the appropriate function in the Description column and then choose **Define Timer** from the **Edit** menu.

NOTE

Full backup and restore can not be scheduled for execution!

The specified cyclic execution time(s) and repetition interval are valid only if the Cyclic Execution Enabled field is set to on. Click on the Cyclic Execution Enabled field to turn the execution state on or off.

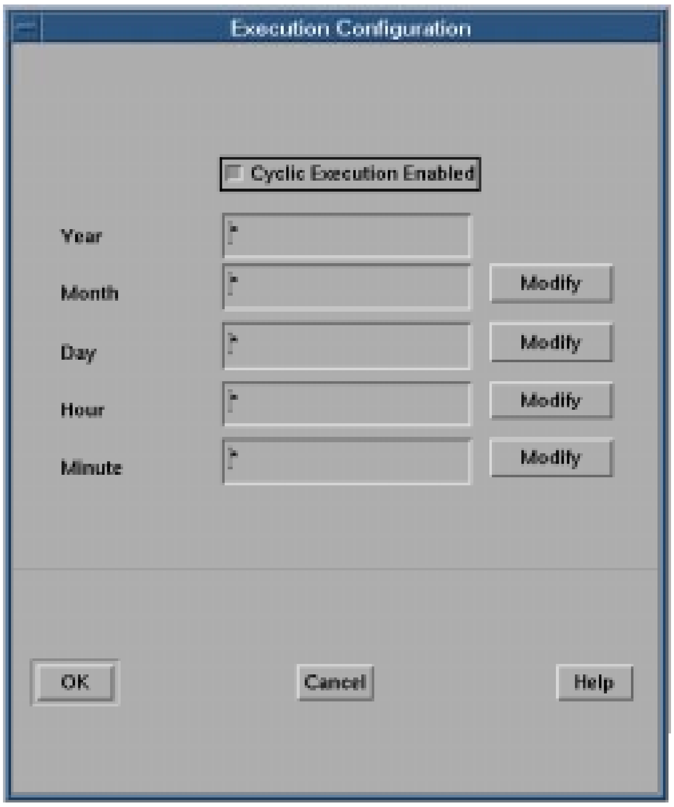


Figure 5-11. The Execution Configuration dialog box

NOTE

Since setting cyclic execution to off does not affect other execution configuration data, you can turn cyclic execution off temporarily and then start it again.

To specify the date and time enter the year(s), month(s), day(s), and hour and minute as described in the following sections.

5.7.7.1 Year Configuration

Enter the year as a text string in the Year field. The format of this text string is YYYY, for example: 1993. The default value is an asterisk (*) which specifies every year.

5.7.7.2 Month Configuration

You can enter the month(s) as a text string in the following format:

*	Execution takes place every month (default).
MMM,MMM	One or several months are specified in a list. Example JAN,NOV
MMM-MMM	A sequence of consecutive months. Example FEB-APR

The following English abbreviations are used for months: JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, and DEC.

As an alternative you can configure the month via the month configuration dialog box, Figure 5-12. To display this dialog box click the **Modify** button to the right of the month field.

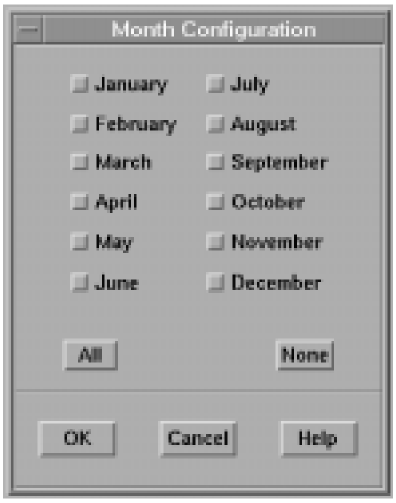


Figure 5-12. Month Configuration dialog box

Choose the month(s) you want using the Month Configuration dialog box as described below:

January - December	Click on the button to the left of the month you want to select or deselect. You can select any combination of months.
All	Click on **All** button to select all months.
None	Click on **None** button to clear all selected months.
OK	Click on **OK** button to save the month definition and exit the dialog box.
Cancel	Click on **Cancel** button to exit the dialog box without modifying the month definition.
Help	Click on **Help** button to display the Help message box.

5.7.7.3 Day Configuration

You can enter the day(s) as a text string in the following format:

*	Execution takes place every day of the week (default).
DDD,DDD	One or more days. Example: MON,TUE
DDD-DDD	A sequence of consecutive weekdays. Example: MON-FRI

The following English abbreviations are used for days: MON, TUE, WED, THU, FRI, SAT, and SUN. Use the following text format for dates:

*	Execution takes place every day of the month (default).
NN,NN	One or more days of the month (1-31). Example 1,5,30
NN-NN	A sequence of consecutive days of the month. Example 1-5, 1-LAST
Last	Enter "Last" for the last day of the month.

As an alternative you can configure the day via the Day Configuration dialog box, Figure 5-13. To display this dialog box click the **Modify** button to the right of the Day field.

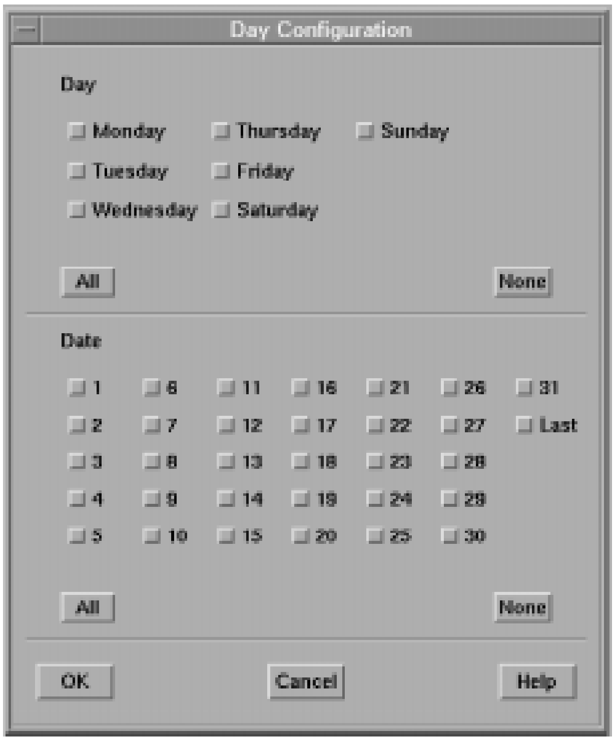


Figure 5-13. Day Configuration dialog box

Choose the day(s) you want using the Day Configuration dialog box as described below:

Monday - Sunday	Click on the button to the left of the weekday you want to select or deselect.You can select any combination of days.
All	Click on **All** button in the Day section to select all days of the week.
None	Click on **None** button in the Day section to clear all selected days of the week.
1 - 31	Click on the button to the left of the number corresponding to the day of the month to select or deselect. You can select any combination of dates.
All	Click on **All** button in the Date section to select all dates.
None	Click on **None** button in the Date section to clear all selected dates.
Last	Click on **Last** button in the Date section to select the last day of the month.
OK	Click on **OK** button to save the definition and exit the dialog box.
Cancel	Click on **Cancel** button to exit the dialog box without modifying the definition.
Help	Click on **Help** button to display the Help message box.

5.7.7.4 Hour Configuration

You can enter the hour of the day as a text string in the following format:

*	Execution takes place every hour (default).
HH,HH	One or several hours (0 - 23) are specified in a list. Example: 7,18,23
HH-HH	A sequence of consecutive hours. Example: 7-9

As an alternative you can configure the hour via the Hour Configuration dialog box, Figure 5-14. To display this dialog box click the **Modify** button to the right of the Hour field.

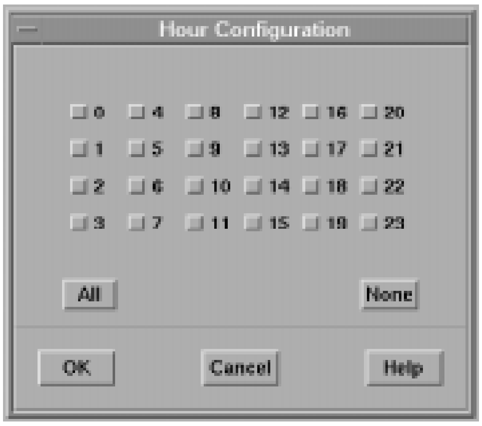


Figure 5-14. Hour Configuration dialog box

Choose the hour(s) you want using the Hour Configuration dialog box as described below:

0 - 23	Click on the button to the left of the number corresponding to the hours you want to select or deselect.You can select any combination of hours.
All	Click on **All** button to select all hours.
None	Click on **None** button to clear all selected hours.
OK	Click on **OK** button to save the definition and exit the dialog box.
Cancel	Click on **Cancel** button to exit the dialog box without modifying the definition.
Help	Click on **Help** button to display the Help message box.

5.7.7.5 Minute Configuration

You can enter the minute of the hour as a text string in the following format:

*	Execution takes place every minute (default).
MM,MM	One or several minutes (0 - 59) in a list. Example: 15,30,45
MM-MM	A sequence of consecutive minutes. Example: 0-15

As an alternative you can configure the minutes via the Minute Configuration dialog box, Figure 5-15. To display this dialog box click the **Modify** button to the right of the Minute field.

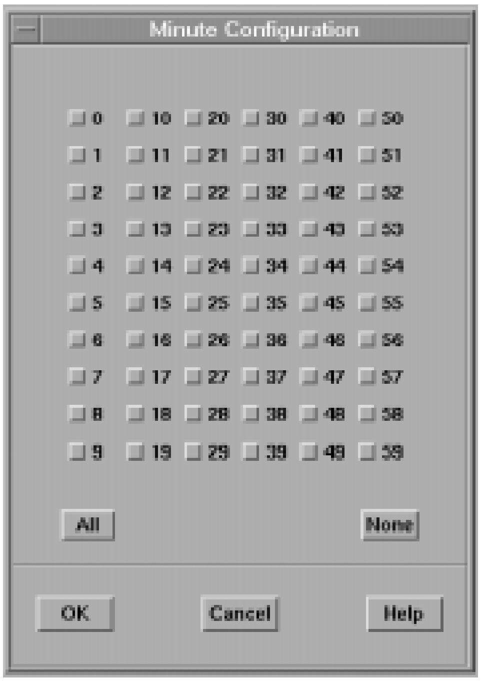


Figure 5-15. Minute Configuration dialog box

Choose the minute(s) you want using the Minute Configuration dialog box as described below:

0 - 59	Click on the button to the left of the number corresponding to the minutes you want to select or deselect.You can select any combination of minutes.
All	Click on **All** button to select all minutes.
None	Click on **None** button to clear all the selected minutes.
OK	Click on **OK** button to save the definition and exit the dialog box.
Cancel	Click on **Cancel** button to exit the dialog box without modifying the definition.
Help	Click on **Help** button to display the Help message box.

5.8 Disk Space Recovery

When certain errors occur on the Advant Station (such as when an AdvaInform application quits unexpectedly), core files may be created and stored on disk. Also log files may be used to store information regarding certain error conditions. These files can be used by a system administrator to determine the cause of the error. If core files are not removed periodically and log files are not trimmed, they may consume so much disk space that performance of the IMS is affected.

It is recommended that disk capacity be checked periodically using the `bdf` command. If a file system is approaching 100% capacity, a system administrator should be contacted to remove core files and/or trim log files. This functionality is provided via the SAM function

CAUTION

Core files should not be removed and log files should not be trimmed until a system administrator has read the contents of the files.

5.9 Saving disk space

The following are some hints on how to save and restore disk space.

- Do not add large files to other LVM:s than /home.
- Check your system from time to time for large files, and delete them if they are not required.
- If you have upgraded Your Advant Station and you know that you have had problems with function crashes, there may be core files on your disks. To check for core files that can be deleted, log in on the IMS Menu as ocsmgr and open **System-Maintenance**.
  - Choose **Routine Tasks**.
  - Choose **Disk Space Recovery**.
  - Choose **Core File Removal**.
  - Skip the initial search?: **`Yes`**.
  - Choose **Actions - Modify search criteria**.
  - Use search criteria `/`.

5.10 UPS system messages

The UPS supervision produces a number of system messages and system events. The texts are nearly identical. The only difference is who receives the information. The messages and the corresponding action to take are described in Section 3.5.2, UPS States and Corresponding Messages.

5.11 Usage of dcSystem.log

All system messages are routed to the System Message Log and can be displayed with the System Message Log Display. If problems occur a flag can be turned on to get more information output to the file `/var/opt/advant/log/IMS/dcSystem.log`. Edit the `/opt/advant/Startup/etc/dcStartup.env` file and set the SYSTEM_LOG_ACTIVE variable:

```
export SYSTEM_LOG_ACTIVE=Y
```

The IMS must be restarted to activate/deactivate the log file.

The `dcSystem.log` can be used to analyze how the system is running. However the log file should normally not be used as standard since it can grow quite large and fill the system disk. If the file gets large it can be truncated without stopping the IMS through the following command:

```
cp /dev/null /var/opt/advant/log/IMS/dcSystem.log
```

5.12 How to use man -k

When you want to use an HP-UX operating system command, but you are not sure of the command name, you can generally use the following:

```
man -k <key word>
```

For example: `man -k time` will give you all operating system commands related to time.

You can read more about this by using following command in a terminal window: **man man**

Appendix A Log in to the Initial System Loader (ISL)

A.1 General

This appendix describes how to start the Initial System Loader using the HP-UX Core-OS CD.

A.1.1 Procedure for AS 520/B132L, AS 520i /B132L, AS 530/C110 and AS 530/B180L

1. Insert the HP-UX Core-OS CD in the CD-ROM drive.
2. Turn on the Advant Station 500 (or boot the target station by logging in as the root user and entering **`shutdown -r 0`**).

   After about one minute, the following messages are displayed, Figure A-1.

```
---
Processor is booting from first available device.

To discontinue press any key within 10 seconds.
```

Figure A-1. Initial Screen for AS520 /B132L. The text on first line differ on AS530/B180L.

3. When you see the messages shown in Figure A-1, press any key and the boot will be terminated and Main Menu will be displayed, see Figure A-2.
4. Use the **search ipl** command to find bootable devices.
5. Select the CD-ROM as boot device and enter command:

   boot <path number> ipl

```
  ---
  Processor is booting from first available device.
  To discontinue press any key within 10 seconds
  Boot terminated

  -------Main Menu---------------------------------------
Command                                Description
BOoth [PRI|ALT|<path>]                 Boot from specified path
PAth [PRI|ALT|CON|KEY][<path>]         Display or modify path
SEArch [DIsplay|IPL] [<path>]          Search for boot devices
COnfiguration [<command>]              Access Configuration menu/commands
INformation [<command>]                Access information menu/commands
SERvice [<command>]                    Access service menu/commands
DIsplay                                Redisplay Current menu
HElp [<menu>|<command>]                Display help for menu or command
RESET                                  Restart the system


Main Menu: Enter command>
  ---
```

Figure A-2. Dialog to select Boot Path for AS520 /B132L

6. After a few minutes the `ISL>` prompt appears.

NOTE

From a German or Swedish keyboard, you must use the upper case keys **)=Ö** to obtain the requested **():** characters.

A.1.2 Procedure for AS515/50 and AS520/50

1. Insert the HP-UX Core-OS CD in the CD-ROM drive.
2. Turn on the Advant Station 500 (or boot the target station by logging in as the root user and entering **`shutdown -r 0`**).

After about one minute, the following messages are displayed, Figure A-3.

```
---
Selecting a system to boot.
To stop selection process, press and hold the ESCAPE key.
```

Figure A-3. Initial Screen for AS515/50 and AS520/50

3. When you see the messages shown in Figure A-3, press and hold <**ESC**> until you see a small menu and the following message: `Select from menu:`, bottom of Figure A-4.
4. Select the CD-ROM as boot device and enter command:

   b <Device Selection> isl

```
---
Selecting a system to boot.
To stop selection process, press and hold the ESCAPE key.

Selection process stopped.

Searching for Potential Boot Devices.
To terminate search, press and hold the ESCAPE key.

Device Selection     Device Path              Device Type
--------------------------------------------------------------
P0                   scsi.6.0                 QUANTUM PD425S
P1                   scsi.5.0                 HP C2235
P2                   scsi.2.0                 TOSHIBA CD-ROM XM5401TA


b) Boot from specified device
s) Search for bootable devices
a) Enter Boot Administration mode
x) Exit and continue boot sequence
?) Help

Select from menu:b P2 isl
---
```

Select from menu message

Figure A-4. Dialog to select Boot Path for AS515/50 and AS520/50

5. After a few minutes the `ISL>` prompt appears.

NOTE

From a German or Swedish keyboard, you must use the upper case keys **)=Ö** to obtain the requested **():** characters.

A.1.3 Procedure for AS515/64 and AS515/100

1. Insert the HP-UX Core-OS CD in the CD-ROM drive.
2. Turn on the Advant Station 500 (or boot the target station by logging in as the root user and entering **`shutdown -r 0`**).

   After about one minute, the following messages are displayed, Figure A-3.

```
Press <ESCAPE> to stop boot sequence
```

Figure A-5. Initial Screen for AS515/64 and AS515/100

3. When you see the messages shown in Figure A-3, press and hold <**ESC**> until you see a small menu and the following message: `BOOT_ADMIN>`:, bottom of Figure A-4.
4. Use the **Search ipl** command to find bootable devices.
5. Select the CD-ROM drive as boot device.
   At the `BOOT_ADMIN> prompt` enter: **`boot <Device Path> isl`**.

```
 -----------------------------------------------------------------------
Command                                Description
-------                                -----------
Auto [boot|search] [on|off]            Set/show auto mode
Boot [pri|alt [isl]]                   Boot from primary or alternate path
Boot [scsi|eisa.<slot>[.<addr>]] [isl] Boot from SCSI or EISA
...
Search [ipl] [scsi|eisa]               Show potential boot devices
Search [ipl] [lan [install]]           Show potential LAN devices
Secure [on|off]                        Set/show security mode
 ------------------------------------------------------------------------------
BOOT_ADMIN> Search ipl

Device Path                            Device Type
-----------                            -----------

scsi.6.0                               QUANTUM FIREBALL10505   ipl

scsi.5.0                               MICROP 2112             ipl

scsi.2.0                               TOSHIBA CD-ROM XM5401TA ipl

BOOT_ADMIN> boot scsi.2.0 isl
```

Figure A-6. Dialog to select Boot Path for AS515/64 and AS515/100

6. After a few minutes the `ISL>` prompt appears.

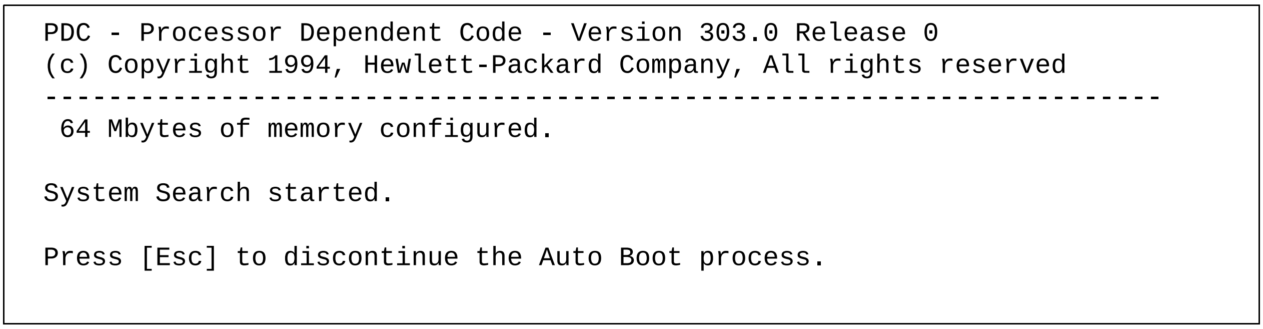
NOTE

From a German or Swedish keyboard, you must use the upper case keys **)=Ö** to obtain the requested **():** characters.

A.1.4 Procedure for AS520i/64 and 520i/100

1. Insert the HP-UX Core-OS CD in the CD-ROM drive.
2. Turn on the Advant Station 500 (or boot the target station by logging in as the root user and entering **`shutdown -r 0`**).

   After about one minute, the following messages are displayed, Figure A-3.



```
PDC - Processor Dependent Code - Version 303.0 Release 0
(c) Copyright 1994, Hewlett-Packard Company, All rights reserved
----------------------------------------------------------------------
 64 Mbytes of memory configured.

System Search started.

Press [Esc] to discontinue the Auto Boot process.
```

Figure A-7. Initial Screen for AS520i/64 and AS520i/100

3. When you see the messages shown in Figure A-3, press and hold <**ESC**> until you see a small menu of options for continuing this procedure.

4. Select item **`1 - `**`“Boot From a Device”`, Figure A-4.

```
==== MAIN MENU ================================

Key  Operation
---  -----------------------------------------
  1  Boot From a Device
  2  Path Configuration
  3  Mode Configuration
  4  Interactive Testing
  5  Firmware Information
  6  Hardware Information
  7  System Configuration
...  .........................................
 77  Reset the System
 88  Change Mode
 99  Restart Auto Boot
----------------------------------------------
Press Key, then press [Enter/Return] 1
```

Figure A-8. Dialog to select Boot Path for AS520i/64

5. This displays the Boot from device menu.
6. Select **`3`** - `“SCSI.2.0    TOSHIBA CD-ROM XM54001TA”`, Figure A-4.

```
==== BOOT FROM DEVICE =======================

Key  Boot Device
---  -----------------------------------------
1  SCSI.6.0 SEAGATE ST31200N
2  SCSI.5.0 MICROP  2112
3  SCSI.2.0 TOSHIBA CD-ROM XM54001TA
...  .........................................
0  Previous Menu
33  Effective ISL Mode  [ INTERACTIVE ]
66  Rescan for Boot devices
77  Reset the System
----------------------------------------------
To boot from a device, Press Key, then press [Enter/Return] 3
```

Figure A-9. Dialog to select Boot Path for AS520i/64

7. After a few minutes the `ISL>` prompt appears.

NOTE

From a German or Swedish keyboard, you must use the upper case keys **)=Ö** to obtain the requested **():** characters.

A.1.5 Installation procedure for AS530/99

1. Insert the HP-UX Core-OS CD in the CD-ROM drive.
2. Turn on the Advant Station 500 (or boot the target station by logging in as the root user and entering **`shutdown -r 0`**).

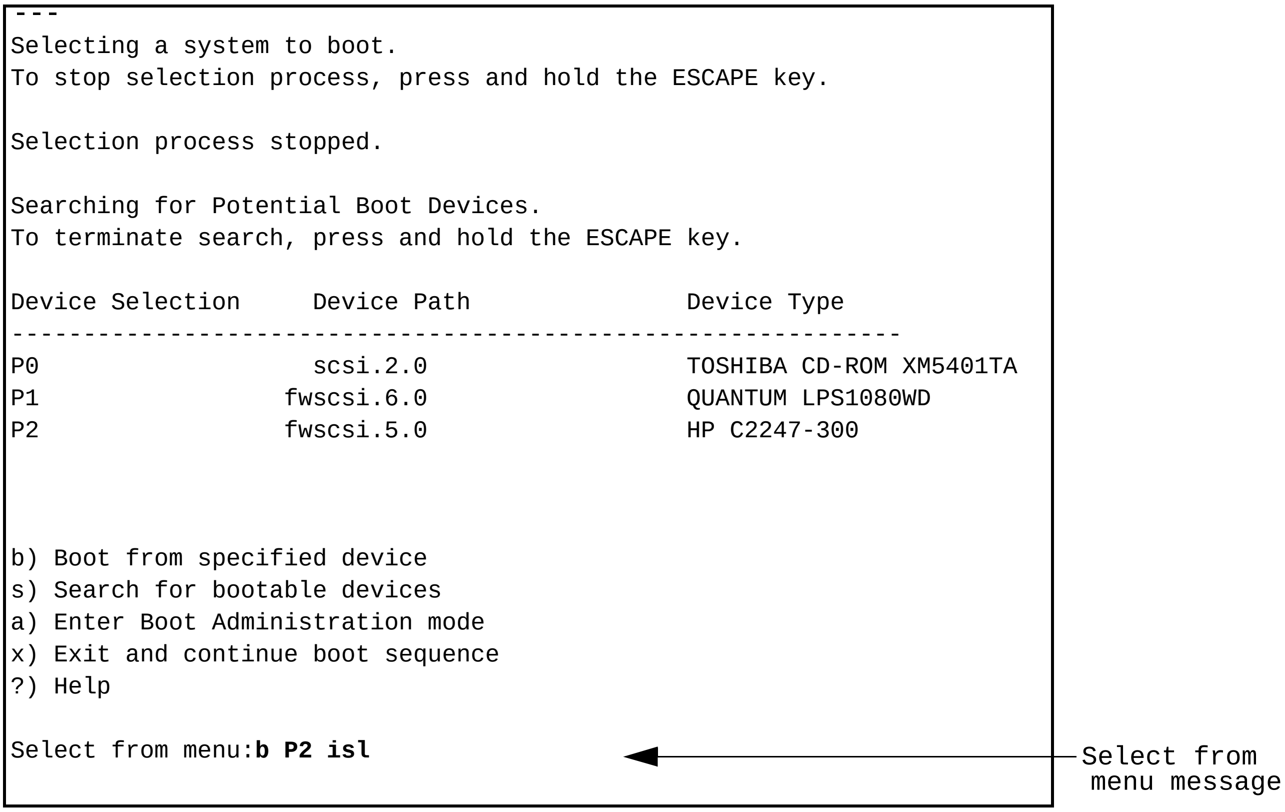
   After about one minute, the screen comes up with messages as shown in Figure A-3.

```
---
Selecting a system to boot.
To stop selection process, press and hold the ESCAPE key.
```

Figure A-10. Initial Screen for AS530

3. When you see the messages shown in Figure A-3, press and hold <**ESC**> until you see a small menu and the following message: `Select from menu:`, bottom of Figure A-4

4. Select the CD-ROM drive as boot device. At the `Select from menu: prompt` enter: **`b <Device Selection> isl`**.).



```
---
Selecting a system to boot.
To stop selection process, press and hold the ESCAPE key.

Selection process stopped.

Searching for Potential Boot Devices.
To terminate search, press and hold the ESCAPE key.

Device Selection     Device Path               Device Type
--------------------------------------------------------------
P0                     scsi.2.0                TOSHIBA CD-ROM XM5401TA
P1                   fwscsi.6.0                QUANTUM LPS1080WD
P2                   fwscsi.5.0                HP C2247-300



b) Boot from specified device
s) Search for bootable devices
a) Enter Boot Administration mode
x) Exit and continue boot sequence
?) Help

Select from menu:b P2 isl
```

Figure A-11. Dialog to select Boot Path for AS530

5. After a few minutes the `ISL>` prompt appears.

NOTE

From a German or Swedish keyboard, you must use the upper case keys **)=Ö** to obtain the requested **():** characters.

Appendix B IMS File System

B.1 Top Level

The top-level structure for the file system is shown in Figure B-1.

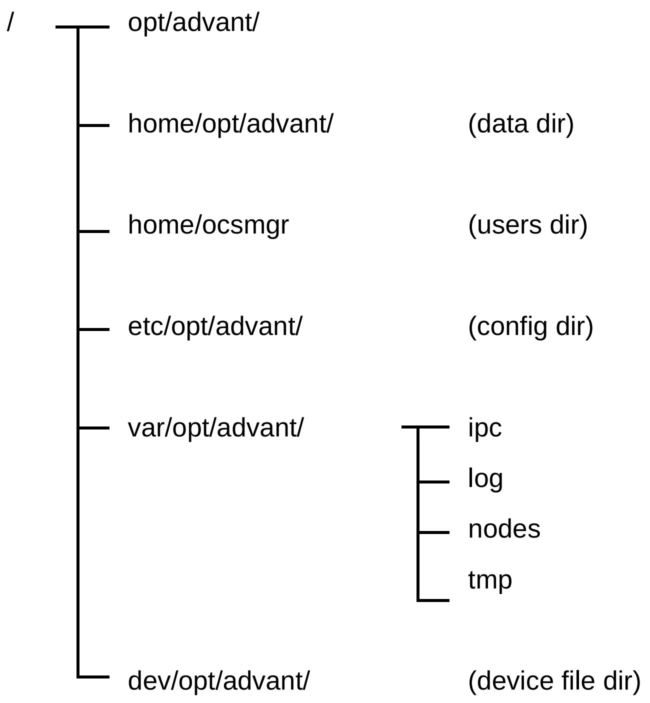


Figure B-1. File System - Top Level

The following is a brief description of directories and their contents.

/opt/advant

This directory is the top level of the software components. IMS is built on several components, some of these are common with the Operator Station and Engineering Station products. Each component has its own versions. If other software is inserted it can be inserted here.

/home/opt/advant

This directory is for data.

/dev/opt/advant

This directory is for device files.

/var/opt/advant/ipc

This directory is for fifo files.

/var/opt/advant/log

This directory is for logging files.

/etc/opt/advant

This directory is for configuration data for all components.

/var/opt/advant/nodes

This directory is for node configurations (for the IMS and external nodes).

/var/opt/advant/tmp

This directory is for temporary files.

/home

This directory is the home directory for different IMS users.

B.2 Components Level

The components level of the file system is shown in Figure B-2.

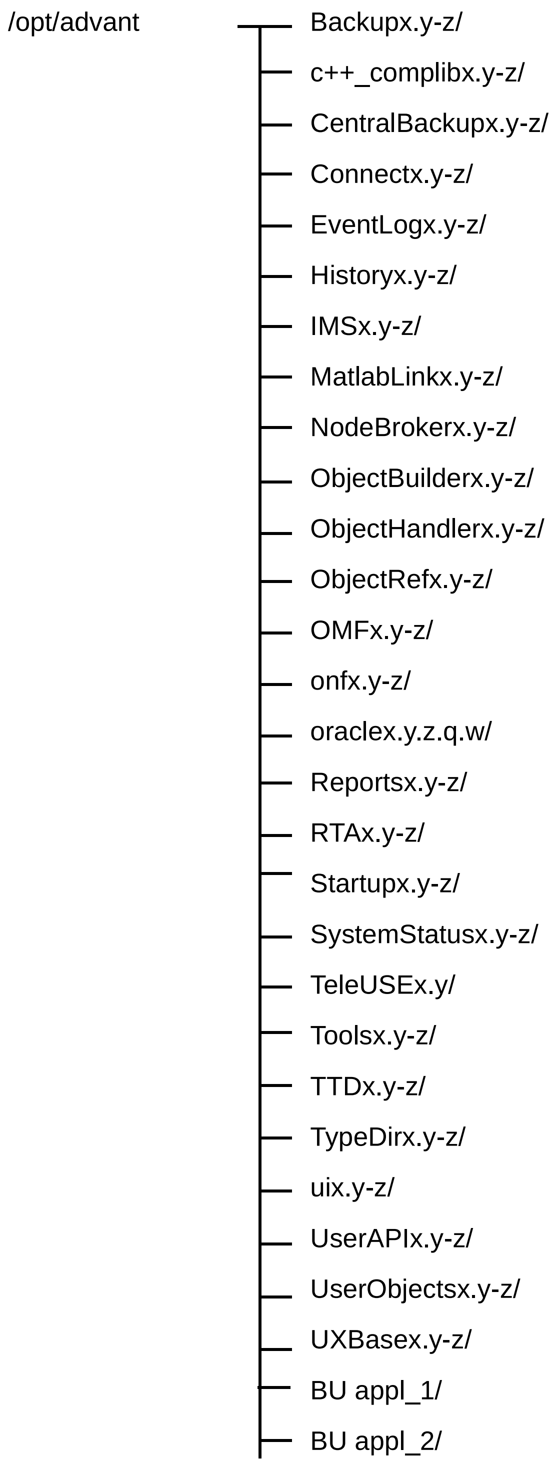


Figure B-2. File System - Components Level

B.3 Function Level

Each component has it´s files organized as shown in Figure B-3.

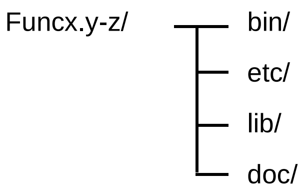


Figure B-3. File System - Each component

Funcx.y-z

Funcx.y-z includes:

- **bin** - executable files (binaries, start and stop scripts for products or processes).
- **etc** - environment file and files that do not belong any where else.
- **lib** - libraries, For instance for Native Language Support
- **doc** - documentation, for example, release notes.

General

include - object type definition files in C syntax (header files). Used by application programmer using Object Access Services in AdvaInform User API.

There are subdirectories under each component. These are component-dependent but there should be at least one **bin** and one **etc** directory. The **bin** directory contain executable files. The **etc** directory contains an environment file. The **install** directory includes installation scripts. The **help** directory includes help document and so on.

A functional component can be a ABB BU/LIAD application.

B.4 Data Level

The data level for the file system is shown in Figure B-4.

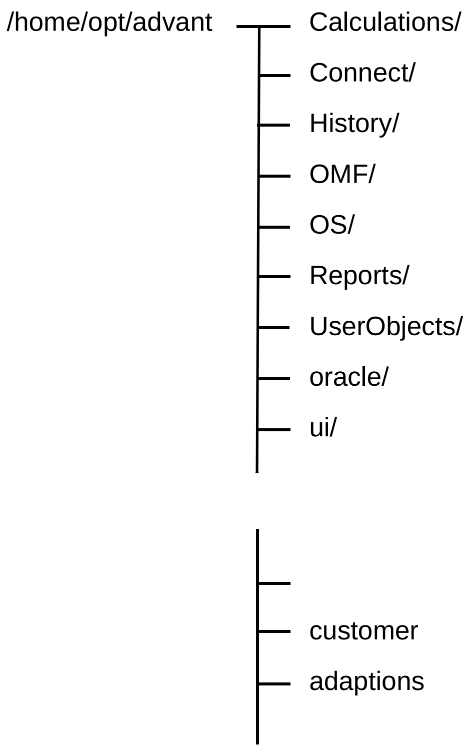


Figure B-4. File System - Data Level

The component sub-directories of the data root directory /home/opt/advant contain all AdvaInform, AdvaBuild and AdvaTalk databases that are included in the delivery. As application developer you are not allowed to place your files under this structure. They shall be created under the customer data root: **`/home/opt/advant/customer`**.
At an upgrade ABB takes care of directories and files in the customer and adaptation data roots.

UserObjects -

The underlaying directories and files are handled by tools in
AdvaBuild Object Type Builder and AdvaInform Object Handling. The run time environment for User Objects are placed here.

oracle -

No tables or views are allowed to be created or altered by the end user except when using tools developed by ABB. The Oracle instance is only to be used for ABB configuration data.

customer - end user data directories. For example:

- **UserAPI** - Store your user api programs here
- **UserObjects** - Store your OTD-files related to user defined User Objects.
- **Reports** - Store your report files here

adaptations - ABB BU/LIAD data directories. For example:

- This directory is for ABB BU/BA/LIAD databases.
- Data files used in applications ought to be placed here.
- Development environment for User Objects for BU/LIAD.

INDEX

Numerics
3-GL 1-18
3-GL (third generation language) 1-30
3rd party software 1-2

A
add more RAM 5-6
adding users 5-5
additional memory 1-3, 1-37
AdvaBuild Central Backup 1-26
AdvaBuild Object Type Builder 1-26
AdvaInform Calculation 1-24
AdvaInform Calculations 1-37
AdvaInform Event Log 1-13, 1-24
AdvaInform History 1-23
AdvaInform Object Handling 1-23
AdvaInform Reports 1-23
AdvaInform User API 1-22, 1-30
  Object Access Services 1-30
  SQL services 1-31
AdvaInform User API. See User API 1-30
alarms 1-32
application 1-28, 3-41
  processes 3-41
AREA object 3-6
arguments 3-41
AS515 A-1 to A-2
AS515/64 A-4
AS520 A-1 to A-2
AS520i/64 A-5
AS530 A-7
ASCII text 3-25
AUTO START 3-4

B
backup 5-6, 5-8
  full 5-7, 5-11, 5-15
  incremental 5-7, 5-15
backup and restore functions 5-9
Basic Object 1-32
Basic Object Types 1-23
battery low 3-27
boot path A-8
buffers 5-6

C
C++ 1-29
change
  defaults 5-5
  setups 5-5
change password 3-39
clock synchronization message 3-61
clockmaster 3-61
communication 3-28
  Set Up window 3-28
configuration
  day 5-22
  hour 5-24
  minute 5-25
  month 5-21
  rules for nodes 3-28
  year 5-21
conventions 1-8
core files 5-26
core system 1-21
create a new user 3-34

D
DAT 5-9
  drive 3-26
  tape 5-7
database
  backup 5-7
  link 1-5
date and time
  dialog box 3-61
date and time setting 3-61
daylight saving 3-55, 3-59
dcSystem.log 2-50
default
  language 3-33
  user 3-32
DEFAULT ENVIRONMENT 3-5
define system variables 3-49
delete user 3-40
deleting users 5-5
device files 3-10
dimension error log 3-51
directory
  for IMS components B-2
  for IMS data B-2
disk

- drive 1-37
- space recovery 5-26

DO RATE 3-5
documentation. See user documentation 1-9
dynamic
- data 5-7, 5-15

E

editor 3-49, 5-5
engineer 3-33
environment 3-31
Event Log 1-13
events 1-32, 5-26
execution time
- day configuration 5-22
- hour configuration 5-24
- minute configuration 5-25
- month configuration 5-21
- year configuration 5-21

existing user
- modify 3-38

F

failure
- hard disk 5-14

File Systems for IMS B-1
- components level B-3
- IMS level B-4
- top level B-1
  - directories and contents B-2
  - directory for IMS components B-2
  - directory for IMS data B-2

fork 5-4
full backup 5-7, 5-11, 5-15
full restore 5-7, 5-11 to 5-12
- from HP-UX command line 5-9

G

GENERICD object 3-1, 3-3
German 3-34
group application processes 3-41

H

hard disk
- failure 5-14

hardware options
- disk drive 1-37
- primary memory 1-37
- printer 1-37
- X-terminal 1-37

historical data 1-13
History 1-23
history archive functions 5-7, 5-15
History logs 1-19
HISTORY object 3-5
home directory 3-31
HP-UX 1-5
- kernel 5-6

HP-VUE 1-5
HP-VUE Login screen 2-1

I

icon 2-2 to 2-3
IMS 1-1, 1-20
- category 3-32
- menu 2-2
- shutdown 3-41
- supervision 3-41
- user 3-32

IMS Basic Object 1-32
IMS Basic Objects 1-18
IMS Menu 1-19
IMS relational database 1-31
IMS User Interface 1-20
imsopr 3-30
IMSstart 2-49
IMSstop 2-3
incremental backup 5-7, 5-15
- manual restore 5-17

Index 2-50
install upgrades 2-45, 2-47
installation of the IMS software 2-5

L

language 3-32 to 3-34
last execution date 5-8
license 1-3
log files 5-26

M

mail 3-49, 5-5
maintenance
- buffers 5-6
- changing
  - defaults 5-5
  - setups 5-5
- editor 5-5
- HP-UX kernel 5-6

- Mail 5-5
- node address 5-5
- node name 5-5
- semaphores 5-6
- swap space 5-6

manual restore of incremental backup 5-17
MasterAid 3-51
MB200 3-54
MB300 3-28
MB300E 3-54
MESSAGE CTR 3-8
mknod function 3-10
modify existing user 3-38
MSG_ROUT Object 3-8

N

network
- addresses 3-29
- parameters 3-28

node
- address 3-29, 5-5
- name 5-5
- type 3-29

NODE TYPE 3-5

O

object
- basic 1-32
- process 1-32
- user 1-37

Object Access Services 1-30, 1-36
Objects 1-19
ODBC driver for Windows 3.11 1-27
open system 1-20
operating system 1-5
- user 3-30

operator 3-33
Operator Station 1-32
Oracle
- database files 5-15
- databases 1-31
- license 1-3
- RDBMS 1-3
- Run-Time license 1-4
- SQL*ReportWriter 1-23

OS 1-20

P

parallel
- interface 3-25
- port 3-25

password 3-32
- change 3-39
- set password 3-35, 3-37

peripheral devices 3-10
peripherals 3-10
PHYSICAL DEVICE 3-4
Plant Network 1-20
port A 3-25
port B 3-25
power
- cord 3-26
- down 2-4

pre-defined
- device files 3-10
- user 3-30

primary memory 1-37
Printer 3-25
printer 1-37, 3-25
privileges 3-30
process database 1-31
Process Startup 3-41
programming language 1-29

R

RDBMS 1-20
real time
- priority 3-41

redundant configuration 3-29
REMOTE TYPE 3-8
Reports 1-23
restore 5-6, 5-8
- from HP-UX command line 5-9
- full 5-7, 5-11 to 5-12
- incremental 5-7, 5-15
- of incremental backup 5-17

RTA 1-20, 3-61
- Board Configuration 3-51

RTA language 3-54
run-time
- license 1-3

S

SAM 3-10
SCSI
- device 3-26
- peripherals 3-26
- SCSI port 3 3-26

scsi port 5 3-25
semaphores 5-6
serial ports 3-25
set password 3-35, 3-37
Settings menu 5-5
shutdown 3-27, 3-41
software licenses
    Oracle Forms 1-3
    Oracle Run-Time license 1-4
    run-time license for a relational database 1-3
    SQL*Net 1-3
    SQL*Plus 1-3
    TCP/IP driver for SQL*Net 1-3
SOFTWARE NAME 3-4
SQL 1-20, 1-22, 1-25
SQL services 1-31
SQL* ReportWriter 1-23
SQL*Connect 1-12
SQL*Net 1-20
SQL*NET and ODBC for Windows 3.11 1-27
start-up 3-41
station backup
    window 5-8, 5-10
status 5-8
supervision 2-49
swap space 5-6
Swedish 3-34
System 3-33
System Administration Manager 3-10
system messages
    window 3-51
System Status 3-41
System Variables 3-49
    edit 3-49
    settings 3-49
    window 3-49

T

TCP/IP 2-48
    network 1-20
TCP/IP Printer 3-25
terminology 1-18
time synchronization 3-55

U

uninterruptible power supply 3-27
UPS 2-50, 3-27
    hardware 3-27
    states 3-27
US American 3-34
user 3-32
    application 1-28
    authority 3-30
    categories 3-30, 3-33
    create a new user 3-34
    delete 3-40
    description 3-34
    interface 1-20
    name 3-33 to 3-34
    privileges 3-31
User API 1-22, 1-30, 1-32
User Definition
    window 3-32
user documentation
    AdvaBuild Object Type Builder User's Guide 1-13
    AdvaInform Basic Functions User's Guide 1-12
    AdvaInform Event Log 1-13
    AdvaInform History User's Guide 1-13
    AdvaInform Object Handling User's Guide 1-13
    Advant Station Hardware User's Guide 1-11
    Advant Station IMS User's Guide 1-11
    AdvaTalk Link to MATLAB 1-14
user object 1-37
    instance tables 5-16
users 1-3

X

X-
    client 1-20, 1-27
    station software 1-27
    technology 1-20
    terminal 1-20, 1-37
X-station 2-50